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KEY TO PRONUNCIATION.

ä	far, father
ā	fate, hate
a or ă	at, fat
ã	air, care
ạ	ado, sofa
â	all, fall
ch	choose, church
ē	eel, we
e or ĕ	bed, end
ė	her, over: also Fr. *e*, as in *de*; *eu*, as in *neuf*; and *oeu*, as in *boeuf*, *coeur*; Ger. *ō* (or *oe*), as in *ōkonomie*.
ȩ	befall, elope
ẽ	agent, trident
ff	off, trough
g	gas, get
gw	anguish, guava
h	hat, hot
h or H	Ger. *ch*, as in *nicht, wacht*
hw	what
ī	file, ice
i or ĭ	him, it
i	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din
j	gem, genius
kw	quaint, quite
ṅ	Fr. nasal *m* or *n*, as in *embonpoint, Jean, temps*
ñ	Span. *ñ*, as in *cañon* (căn′yŏn), *piñon* (pēn′yōn)
ng	mingle, singing
nk	bank, ink
ō	no, open
o or ŏ	not, on
ô	corn, nor
ȯ	atom, symbol
ọ	book, look
oi	oil, soil; also Ger. *eu*, as in *beutel*
ō or oo	fool, rule
ou or ow	allow, bowsprit
s	satisfy, sauce
sh	show, sure
th	thick, thin
ṯh	father, thither
ū	mute, use
u or ŭ	but, us
u̇	pull, put
ü	between u and e, as in Fr. *sur*, Ger. *Müller*
v	of, very
y	(consonantal) yes, young
z	pleasant, rose
zh	azure, pleasure
′(prime), ″(secondary)	accents, to indicate syllabic stress

THE ENCYCLOPEDIA AMERICANA

G

GOETHE, gė'tę, **Johann Wolfgang** (VON), German poet, novelist, playwright, scientist and critic of life: b. Frankfort-on-the-Main, 28 Aug. 1749. From his father, a well-to-do lawyer who practised but little, he inherited methodical ways and a serious attitude toward life. His poetic gift came from his mother, a woman famous for her sprightly letters which have often been edited and translated. The boy Wolfgang grew up in an atmosphere of refinement, his mind duly wrought upon by books, pictures, music and his father's reminiscences of Italy. He never went to school but was taught at home, partly by his father. He early showed a talent for languages; read the usual Latin authors, picked up a good knowledge of French by attending a French theatre that had been started in Frankfort during the occupation of the city by French troops, and learned enough English so that he dared attempt verses in it. As a boy he was very fond of the Bible. His favorite amusement was the puppet-play. He began to make verses before he was 10 years old, soon acquired technical facility and presently came to regard himself as a predestined «thunderer.» At the age of 16 he entered the University of Leipzig to study law, such being his father's wish. The lectures bored him and he failed to find a single appetizing study. The result was a mood of disgust with book-learning: it seemed to him a matter of pretentious verbiage, a floating bog of ignorance, guesswork and prejudice, with no rock-bottom anywhere. Such was the mood from which his masterpiece 'Faust' germinated. His poetic efforts met with discouragement, so that he despaired of himself and burned what he had written. Then came a delirious love-affair with his landlady's daughter, whom he tormented with morbid jealousy. This experience revived his poetic ardor and he made a little play out of it — a one-act pastoral in alexandrine verse, wherein an all-too-jealous lover is duly punished for his perversity. This first play is only a trifle, but it is based on real experience. Henceforth «confession» was to be its author's line; no more «thundering» in ambitious projects like the 'Belshazzar' that he had been working at but the faithful rendering of the things, however humble, that actually concerned him. Out of this same love-affair — the girl's name was Anna Katherine Schönkopf — grew the collection called 'Annette,' consisting of short poems and prose tales which were discovered and published in 1885. They are in the conventional pastoral vein and contain no forewarning of a notable lyric gift. Goethe remained at Leipzig nearly three years. While the university gave him nothing that he could assimilate he found satisfaction in Oeser's art-school, where he took lessons in drawing and etching and learned to admire the «noble simplicity» of Greek art. At this time he was often moody and morose and lived imprudently in a morbid resolve to punish his body for the sins of his mind. In the summer of 1768 he was prostrated by a grave internal hæmorrhage which was at first thought to portend consumption. This sent him home without his degree and doomed him for a year and a half to the life of an invalid recluse. At first his life seemed to be in danger. As he slowly grew better he spent his time reading, meditating and debating the way of salvation with a certain Fräulein von Klettenberg, a saintly pietist who was an intimate of the household. Under her influence religion came home to him as a highly personal matter. His was a normal case of conversion save that there was no conviction of sin, no agonizing over the safety of his soul. He remained cheerful but attended the prayer-meetings of the local pietistic circle, took part in their communion service and for a while used the language of the very devout. Later he drifted away from these associations, but his nature had received an indelible impression. In time men called him and he called himself a heathen, but he had been deeply touched by the mystic appeal of religion and remained to the end of his days deeply sensitive to all genuine manifestations of religious feeling. As his convalescence proceeded he took up the study of the occult, reading Paracelsus, Van Helmont, Welling and other writers on magic, alchemy, cabalism and all that sort of thing. He even set up an alchemist's laboratory and performed some experiments in search of the philosopher's stone. All this, too, was soon left behind, but not without lasting effects. He had got hold of the idea of natural magic (*magia naturalis*), something very different from the vulgar black art and described as the queen of the sciences and the perfect flowering of religion. It was not the art of calling up spirits to do the devil's work, but of getting into communion with planetary beings of a higher order and thus obtaining direct spiritual illumination and divine power, like that of a god. This is the kind of magic that he was to utilize in ‘Faust.’ Before leaving home to continue his university career he published a small collection of songs which he likened to wild flowers. To-day they hardly make that impression, being a young critic's comment rather than a poet's cry. To this period also belongs, probably, a second play in alexandrines, the ‘Fellow-Culprits.’ It is a three-act comedy in which all the characters are morally tainted and finally unmask one another as poor miserable sinners. The piece is not very edifying, but in after years its author had a certain fondness for it as an acting play. In April 1770, Goethe went to Strassburg, then a French city. His plan was to take his degree in law and then to visit Paris for the perfection of his French. But it was not so fated. Circumstances brought it about that in the French atmosphere of Alsace his mind turned against things French, especially the French drama, and he began to feel pride in his German blood and to seek in the history and traditions of his own country the inspiration for the imaginative projects that were already haunting him. Among these were ‘Faust’ and ‘Götz von Berlichingen.’ After he had been at Strassburg half a year, studying more medicine than law, he made the acquaintance of Herder, who was destined to influence him considerably. Herder was about six years older than Goethe and in the first flush of a budding literary reputation. His temper was that of a radical reformer sharply at variance with the spirit of his age. His mind was teeming with the germinant ideas of a new era in literature, criticism, education and religion. He was an ardent admirer of the folksong and held that genuineness of feeling is the only criterion of good literature. He hated artificiality and imitation and loathed the Frenchified verse of the day. He held that the truly great poets such as Homer, Shakespeare and Ossian — he supposed Macpherson's Ossian to be a genuine old Celtic bard — were admirable mainly because they had expressed the life of their several epochs in its fullness and characteristic flavor. The grand criterion of merit was not correctness or good taste, not artistry of any particular kind, but sincerity and fullness of life. The more smell of the soil the better. In many a talk while he was detained in Strassburg by a tedious surgical operation Herder poured these ideas into the listening ear of Goethe, whose mind was all ready to receive them. The consequence was a new orientation. The young law-student conceived a boundless admiration for Homer, Shakespeare and Ossian, became a zealous collector of Alsatian folksongs and made a careful study of the Gothic minster at Strassburg. He felt himself strangely drawn to the then despised Gothic style which he erroneously believed to represent a national German art. In 1772 he published a short dithyrambic paper on the cathedral — a paper which counts as one of the first bugle-blasts of the coming romantic reaction in favor of the Middle Ages. In short, Goethe became — for a little while in his youth — the prey of a perfervid Germanism. And then there was his brief summer romance with the country maid, Friederike Brion, who is so charmingly pictured in the tenth book of his autobiography. Under the spell of this passion he began to indite the songs which usher in a new epoch in the history of German lyric poetry. The characteristic quality of this new lyricism is its power of suggestion. It captivates not so much by what it says as by the overtones of feeling and association that it awakens. It is very simple in form, without any verbal pyrotechnics, true to the elemental feelings of human nature, and based on the old haunting melodies of the folksong. In the summer of 1771 Goethe returned to Frankfort with the title of licentiate (not doctor) and took up the practice of Holy Roman law. His thoughts were now busy with the ‘Autobiography of Götz von Berlichingen,’ whom he idealized as a towering idealist and a “rude self-helper in times of anarchy.” He proceeded to turn some of the more stirring scenes of the old book into dialogue, thus presenting a life-history in a succession of dramatic pictures. Götz was in reality an outlaw, a typical robber-knight of the 16th century, who set himself up against the only forces which were just then making for public order. But Goethe invested him with the halo of a martyr to liberty. In writing he had no thought of the stage or of any rules of play-making. His main artistic purpose was to exhibit the form and pressure of an interesting past epoch. In thus following his instinct in defiance of all conventions he believed that he was Shakespearizing. With some revision the play was published anonymously in 1773 and met with great literary success. Its vigorous realistic prose, its variety of incident, its bluff and hearty life-likeness were very refreshing to a convention-ridden age. In 1774 appeared the ‘Sufferings of Young Werther,’ the most famous of all sentimental novels. The story is told in letters after the manner of Richardson and Rousseau. Werther is a supersensitive, weak-willed youth, sadly lacking in stamina and self-control, who “suffers” from over-tension of feeling. He is something of an artist, but does not draw because of his overwhelming emotions. A passionate lover of nature, of children, of humble folk and of the simple life, he finds the higher social strata everywhere hard-hearted, selfish and conventional. He falls in love with a betrothed girl whom he can neither win nor renounce. Life becomes meaningless and hopeless. At last he shoots himself. This story grew out of experiences of Goethe at Wetzlar, where he lived for a short time in 1772 for the purpose of studying the practice of the imperial Chamber of Justice. Based to some extent on actual letters and seeming to be a veritable transcript of life, ‘Werther’ took Germany by storm and the fame of it soon spread all over Europe. Essentially it is a morbid book and it loosed a flood of mawkish sentimentalism. Its author himself had suffered from the melancholia of adolescence and had even nursed thoughts of suicide. In writing ‘Werther’ he expelled the poison from his own system but at the same time created a gospel of “weltschmerz” and sentimental pessimism for his contemporaries. People wept copiously over the badness of a world that had done to death such a noble, delicate soul as Werther. Withal the splendid literary art of the book, its hectic tension of feeling, and the unprecedented power with which familiar emotional values are exploited, raised it at once to the position of an immortal classic

JOHANN WOLFGANG GOETHE

in its kind. 'Werther' was followed, also in 1774, by 'Clavigo,' a prose tragedy of more regular construction than 'Götz,' based on the memoirs of Beaumarchais. A Spanish youth Clavigo is engaged to a sickly girl but casts her off in the fear that she will be a clog on his ambitious career. Her brother rushes to Madrid to right her wrong and kills Clavigo in a duel by the girl's coffin. In the original memoirs there is no such tragic ending, but in all his early years Goethe's vision of the tragic always included a girl deserted by her lover for prudential reasons. In 1775 came 'Stella,' in which a man deserts his wife out of sheer restlessness, marries another woman and then deserts her too. In the play the two women meet by accident and after painful scenes agree to share the delectable Fernando between them. So far was Goethe willing to go at this time in championing the rights of the afflicted heart against the conventions of society. In a later version he made the play end with the fickle husband's suicide. Several minor works of Goethe's busy adolescence must here be passed by. They are chiefly bagatelles of humorous or satiric import, but one of them is a splendid fragment of a prometheus-tragedy, in which the Titan artist bravely declares war against the ever-living gods. It was not here, however, but in 'Faust' that the insurgent spirit of young radicalism found its appointed vehicle. A considerable part of 'Faust' was "stormed out" in 1774 and 1775. Out of his own transient disgust with book-learning, his study of the occult and his musings on the old legend Goethe had distilled the conception of a superman who despairs of study, deserts the intellectual life and leagues himself with a demon for a grand sensual debauch. Following hints of the old story he made his hero a searcher after truth, an eager traveler and a passionate lover of antique beauty. But for a man of the 18th century these were of course not the traits of a bad man on the way to hell. As soon as the imaginary Faust became the mouthpiece of Goethe's own struggles and aspirations it was all up with his traditionary badness. At first, however, Goethe did not plan to save his hero any more than to damn him. His scheme was that after many years of varied experience Faust would become reconciled to life by finding some useful work to do — work that would give him the sense of having lived to some purpose and permit him to die in a rapt prevision of the benefit others would get from his performance. From this fundamental plan of his youth Goethe never deviated. In the middle portion of his life he decided not only to "save" his hero but to make his ascension among the saints a part of the dramatic action. Faust was now thought of as a man who had gone grievously wrong while wandering in the dark of passion and instinct, but was essentially a "good man" by virtue of his "striving" and would one day be led out into the "clear" by the Lord in Heaven. Thus the old tragedy of sin and damnation was converted into a symbolic drama of struggle toward the light, ending among the saints in glory. The early scenes of 'Faust,' those written before 1776, are mainly occupied with the love-tragedy of Gretchen, which is a terribly drastic comment on the status of the unmarried mother in the Germany of that day. Still another of Goethe's major works was begun in the days of his youth, namely, the tragedy of 'Egmont,' whom he conceived as a "demonic" character borne on to his doom by a levity of spirit amounting to tragic frivolity. In the midst of work on 'Egmont' he was invited by the young Duke of Weimar, then a youth of 18 who had lately taken the reins of government from his mother's hands, to visit the Weimar court. He arrived toward the end of 1775, expecting to stay but a few weeks, but he remained all the rest of his days. The duke liked him, made a friend of him and presently gave him a seat in the government council with the rank of Councillor of Legation. There were many misgivings over this step, for the new official was not of the nobility, had had no experience of public business and was reputed to be a "genius," that is, a person of unsteady and unconventional ways. But he took his new duties very seriously and for some time quite neglected the literary projects that he had brought with him from Frankfort. At different times he had to do with the mining interests, military affairs, public improvements and finances of the little duchy, and in 1784 became president of the Council. He had previously received a diploma of nobility. In the new environment he engaged eagerly in the study of mineralogy, geology, botany and zoology, thus preparing the way for a little paper on the metamorphosis of plants and another on the intermaxillary bone in the human skull. These papers and others have given him a modest place in the history of modern evolutionism. Hard work and close scientific study, together with a fresh reading of Spinoza's 'Ethics,' exerted a sobering influence on his character and helped to ban the demons of unrest which had never quite ceased to haunt him since the days of 'Werther.' On the other hand, the new life gradually starved his artistic nature, for he was a born dreamer who liked nothing else so well as solitary communing with the creatures of his own imagination. Thus there came into his life a dissonance which finally became so sharp that he could refer to it as a "terrible disease." From this he sought relief in the autumn of 1786 by a sudden departure for Italy. He remained there nearly two years, undergoing a "spiritual rebirth." Italy restored his buoyancy of mind, his joy in life. Naturally the poetic achievement of that first decade in Weimar was small. Everything waited for the leisure and the mental serenity that came first in Italy. Most significant are a number of short poems embodying a new ethical philosophy of self-control and high aspiration. He also wrote several dramatic trifles for the amateur actors of the court circle. But his major works made little or no progress. He wrote an 'Iphigenie' in rhythmic prose, but was dissatisfied with it. He also began a play on the life of Tasso and worked intermittently on a new novel called 'Wilhelm Meister's Theatrical Mission,' which was at first conceived as a sort of antidote to 'Werther' in that the hero would be saved by finding a vocation. In these works Goethe appears as the apostle of a refined personal culture based on the equilibrium of feeling and reason. While in Italy he transcribed his prose 'Iphigenie' into mellifluous blank verse, making it a tribute to the sanative power of ideal womanhood such as his partial imagination saw in Charlotte von Stein. After his return he finished 'Tasso' in the same verse, putting into it much of the conflict he had known between the claims of art and of practical affairs. These poetic plays, together with 'Egmont,' which remained unversified, are the finest products of Goethe's art in its second phase. Not highly dramatic they are rich in delicate commentary on human nature. After his return from Italy he did not again put on the harness of an administrative drudge, but devoted himself mainly to letters and scientific study. That emancipation of the sensual man which had taken place in Italy found expression in the frank eroticism of the 'Roman Elegies,' which were written in the early days of his conscience-marriage with Christiane Vulpius. This relation began in 1788. She kept his house and bore him several children; but while he always regarded her as his wife they were not wedded in church until 1806. The outbreak of the French Revolution awakened in him hardly any other emotions than those of cynical disgust. The noisy democracy of France seemed to him to consist only of dupers and duped and he wrote two or three weak plays to exploit the humbug of the revolutionary excitement. In 1792 he accompanied the Duke of Weimar on the Austro-Prussian invasion of France, heard the cannonade at Valmy and saw the seamy side of war when the invaders were tumbled back across the Rhine by the republican armies. And then began, in 1794, under the inspiration of Schiller's friendship, a new era of notable creation. In 1796 he published 'Wilhelm Meister's Apprenticeship,' a cultural novel that had quite outgrown the original scheme. Instead of finding a satisfactory «mission» in play-acting and the management of a theatre Wilhelm is made to conclude that the dramatic art is not his true vocation. Another must be found by search and experimentation. Thus the original «theatrical mission» was changed into an «apprenticeship» in the school of life. In due time an occasion was found for sending the hero to Italy. So the tale was brought to an end unfinished, the way having been prepared for a continuation under the name of 'Wilhelm Meister's Wanderings,' which was not completed until 1829. Taking both parts together 'Wilhelm Meister' is replete with the wisdom of one of the wisest of men, but as prose fiction it is too leisurely and discursive for the modern novel-reader.

A general favorite, on the other hand, is 'Hermann and Dorothea,' written in 1797 in heroic hexameters. It is a picture of German still life drawn against the background of the Revolution. Dorothea is a poor refugee who has been compelled to flee eastward across the Rhine with her fellow-villagers. Amid the general distress she is wooed and won by Hermann, the son of a well-to-do innkeeper. The story is charmingly told, the stately Homeric verse applied to such a lowly theme having somewhat the effect of a subtle humor. Incidentally the scheme afforded a place for Goethe's riper views of the Revolution, though he was too close to the great upheaval to see its larger import. Just at the end of the century he planned a trilogy called the 'Natural Daughter,' which was to picture phases of the Revolution, but only one of the three parts was ever written, and this is a literary closet-drama quite lacking in dramatic power and verisimilitude. The most important work of this period was the completion of the first part of 'Faust.' Back in 1790 he had published some of the scenes on hand under the title 'Faust, a Fragment.' As it ended with the betrayed Gretchen's agony in the cathedral no one could have divined the plan of the poem as a whole. Resuming work on his masterpiece in June 1797, Goethe first wrote a prologue in which the reader was duly apprised that the new Faust would end in heaven, not in hell. Then, finding the material as it lay in his mind too vast for a simple play, he decided to make two parts of it and to postpone for a second part all that portion of the plot which was to follow Gretchen's death. The publication of the first part in 1808 made it clear that here was the high-water mark in German letters; something altogether incommensurable with aught that had gone before. From this time forth Goethe deserved the name applied to him by Lord Byron — «monarch of European letters.» The death of Schiller in 1805 was a great bereavement. For 11 years he and Goethe had been close friends, to some extent collaborators. They worked together on the 'Xenia,' a collection of stinging and stingless epigrams, and also in editing Schiller's magazine *Die Horen.* Withal, as director of the Weimar Theatre — a position he held from 1791 to 1817 — Goethe leaned hard on the superior dramatic insight of Schiller when it was a question of telling work for the stage. The correspondence between the two men is of many-sided interest and counts justly among the classics of letter-writing. In the stormy years that followed Schiller's death, while Europe was battling with Napoleon, Goethe kept to his literary work and scientific studies, paying little attention to world-politics. Nationalistic patriotism was never his affair. What he most cared for was the perfection of the individual, and he had seen German culture flourish greatly under a weak and incoherent empire. He had no reason to suppose that it would flourish better through the aggrandizement of Prussia or Austria. He disliked the Prussians, was suspicious of Russia and as a lover of clearness had much sympathy with the French genius. At Erfurt in 1808 Napoleon treated him very handsomely and he was duly grateful. The only path of safety for himself and his beloved Weimar was to acquiesce in Napoleon's régime. He was not a good hater and he acquiesced. The important works of this Napoleonic period are a third novel, the 'Elective Affinities,' a bulky treatise on the 'Theory of Color,' and the beginning of an autobiography entitled 'From my Life; Poetry and Truth.' The novel is a tragic tale of disaster due to the invasion of the marriage relation by lawless passion. It has no specific tendency other than to show the danger of treating moral relations as if they were subject to necessary laws like those of chemical affinity. The heart of the matter is the story of a sensitive girl's suicide from a morbidly acute sense of remorse. In his 'Theory of Color' Goethe embodied laborious researches that had extended over nearly 20 years and cost him much vexation of spirit because he could not make the world believe that Sir Isaac Newton had been a teacher of false doctrine. In 'Poetry and Truth' we have an elderly man's romanticizing account of his youth. The book ends with the year 1775 and has much to say of his love-affairs. The "poetry" of the title does not mean that there is an admixture of deliberate fiction. Goethe held that a fact is important not because it is true but because it is significant. To select and record the significant, whether in one's own life, or another man's, or in that of an imaginary hero, is to perform an act of the creative imagination, in other words, to poetize. On the whole 'Poetry and Truth' is as accurate as autobiographies are wont to be, and the earlier books at least show Goethe's matured prose style at its very best. To the final phase of his career, his old age, belong, aside from critical and scientific miscellanies, his 'Divan' and the completion of 'Wilhelm Meister' and 'Faust.' In the 'Divan' (1819) the septuagenarian poet turned to account his recent studies in Persian poetry. He borrows the imagery and apparatus of Hafiz and uses it to set forth thoughts of his own. 'Wilhelm Meister' was completed very inartistically, extraneous matter having been included in order to fill space. The 'Wanderings' are most significant for the evidence the book affords of the aging Goethe's interest in the socialistic theories and speculations that were just then beginning to make a noise in the world. From 1824 to 1831 Goethe's principal, but by no means exclusive, occupation was the finishing of the great dramatic poem which he had begun in the nebulous days of his youth. With engaging humor, with no perceptible waning of poetic power, except perhaps in the latter part of the fourth act, and with an astonishing freshness of imaginative vision, he carried his singular hero through a wonderful series of symbolic experiences and finally took leave of him as a divine entelechy mounting heavenward in the train of the Mater Gloriosa, mystically drawn on by the Eternal-womanly. The long task was finished in the summer of 1831 and the aged poet now regarded his life-work as essentially done. He died on 18 March 1832. There is no authentic record of his last words. During the 19th century Goethe's prestige increased enormously, and not merely in his own country, until it became common to link his name with those of Homer, Dante and Shakespeare. Matthew Arnold called him the "clearest, largest and most helpful thinker of modern times"; while Emerson declared that the "old Eternal Genius that built the world had confided itself more to this man than to any other." Such estimates, and many more of like import might be quoted, imply a larger reverence for personal culture and the contemplative life than accords with the temper of the present age. But, however the opinion of coming generations may shape itself with respect to the "helpfulness" of Goethe's thinking, he will always stand out in the retrospect as the great organ-voice of a unique and memorable epoch. See TRUTH AND POETRY; ELECTIVE AFFINITIES; SORROWS OF WERTHER; WILHELM MEISTER; EGMONT; HERMANN AND DOROTHEA; FAUST; IPHIGENIA.

Bibliography.— The literature pertaining to Goethe is enormous. Consult Goedeke's 'Grundriss,' 3d ed., Vols. IV and V, where 1,424 closely printed octavo pages of it are listed. A large part of this literature consists, however, of what has been called Goethe-philology, i.e., books, brochures and articles written by specialists for specialists and dealing with relatively small questions of biography, criticism, personal relations, influence, provenience of ideas, etc. The chief repositories for this kind of research are the 'Goethe-Jahrbuch,' beginning in 1880, and the 'Schriften der Weimar Goethe-Gesellschaft' (28 vols., including numerous portfolios of drawings, facsimiles, etc.). Good periodical reviews of recent Goethe literature are found in the *Jahresberichte für neuere deutsche Literaturgeschichte*, beginning in 1892, and in the journals *Euphorion* and *Das literarische Echo.* Editions, complete and partial, are very numerous since the expiration of the Cotta copyright. The most ambitious is the Weimar edition, 128 vols., comprising 50 vols. of letters and 13 of diaries, together with copious critical apparatus. More convenient is the excellent 'Jubiläumsausgabe' (Stuttgart 1907–10). Meritorious are also the 'Propyläenausgabe' (Munich 1909–14); the Hempel edition, Berlin 1868–79 (new Goldne Klassiker ed., 1910–14); the Heinemann edition (Leipzig 1900), and that contained in Kürschner's 'Deutsche Nationalliteratur.'

The conversations have been best edited by W. Biedermann, 'Goethes Gespräche' (10 vols., Leipzig 1889–96); for the conversations with Eckermann see also Houben's edition (Leipzig 1911). As before stated, the letters are now available all together in Weimar edition of the works; but special mention may be made of the 'Goethe-Schiller Correspondence,' ed. by Graef and Leitzmann (Leipzig 1912); and of the letters to Frau von Stein, ed. by W. Fielitz (Frankfurt 1883–86), and by Fraenkel (Jena 1908). The outstanding biographies are those of Bielschowsky, A. (Munich 1896–1904; trans. by Cooper, New York 1905–08); Brandes, G. (Copenhagen 1915); Carus, P. (Chicago 1915); Chamberlain, H. S. (Munich 1912); Düntzer, H. (Leipzig 1880; trans. by T. W. Lyster, London 1883); Geiger, L. (Berlin 1910); Grimm, H. (Berlin 1875; trans. by S. H. Adams, Boston 1880); Heinemann, K. (Leipzig 1895); Lewes, G. H. (London 1856); McCabe J. (London 1912); Meyer, R. M. (Berlin 1895); Thomas, C. (consisting partly of studies and appreciations; New York 1917); Witkowski, G. (Leipzig 1899). Miscellaneous works of importance are Appell, J. W., 'Werther und seine Zeit' (Oldenburg 1855); Bode, W., 'Goethes Aesthetik' (Berlin 1901); Boucke, E. A., 'Goethe's Weltanschauung' (Stuttgart 1907); Gloël, H., 'Goethes Wetzlarer Zeit' (Berlin 1911); Graef, H. G., 'Goethe über seine Dichtungen' (9 vols., Frankfort 1901–14); Maass, E., 'Goethe und die Antike' (Stuttgart 1912); Magnus, R., 'Goethe als Naturforscher' (Leipzig 1906); Mentzel, A., 'Der Frankfurter Goethe' (Frankfurt 1900); Morris, M., 'Der junge Goethe' (6 vols., Leipzig 1909–12); Schmidt, E., 'Charakeristiken' (Berlin 1896); Scherer, W., 'Aufsätze über Goethe' (Berlin 1886); Vogel, J. and Traumann, E., 'Goethes Studentenjahre' (Leipzig 1910); Wasilewski, W. von, 'Goethe und die Descendenztheorie' (Frankfurt 1903); Weissenfels, R., 'Der junge Goethe' (Tübingen 1899).

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GOETHITE, gē'tīt, a hydrous sesquioxide of iron, contains when pure 62.9 per cent of iron. It differs from hematite in having a yellow streak and from limonite in containing more water and crytallising in the orthorhombic system. It is known in England and in Saxony as well as in the States of Missouri, Colorado and California. The lower grade yellow or reddish iron ores of the Lake Superior region, particularly on the Mesabic range in Minnesota, contain considerable goethite, and the mineral is thus an iron ore of some importance, though it is not distinguished commercially from limonite. See IRON.

GOETSCHIUS, gĕt'shĭ-ŭs, **Percy,** American musical scholar: b. Paterson, N. J., 30 Aug. 1853. He was graduated from the Stuttgart Conservatory, became an instructor there (1876), and was appointed to a royal professorship (1885) by the king of Württemberg. In 1890 he received appointment to the professorship of harmony, musical history and advanced pianoforte in the musical department of Syracuse University, and in 1892–96 was professor of composition in the New England Conservatory at Boston. He became organist of the First Parish Church (Unitarian) of Brookline, Mass., in 1897. In 1905 he was made head of the theory department at the Institute of Musical Art, New York. In addition to his compositions, including anthems, sacred songs and instrumental works, he wrote 'The Material Used in Musical Composition' (1882); 'The Theory and Practice of Tone Relations' (1892); 'The Homophonic Forms of Musical Composition' (1898); 'Applied Counterpoint' (1902); 'Lesson in Music-Form' (1904); 'Exercises in Elementary Counterpoint' (1909); 'Essentials of Music History' (1913); 'The Larger Forms of Musical Composition' (1915).

GOETZ, gĕts, **(Leopold) Karl,** German theologian and author: b. Karlsruhe 1868. He received his education at the universities of Bonn and Berne. Joining the body of Old Catholics he became, in 1892, pastor of one of their congregations at Passau, where he remained for eight years. From 1900 to 1902 he taught in the Old Catholic Seminary of Bonn, and in the latter year became professor at the university there. He published several works on church history, seeking more especially to state the grounds of separation between the Old Catholics and the Papacy. These works are 'Busslehre Cyprians' (1895); 'Geschichtliche Stellung und Aufgabe des deutschen Altkatholizismus' (1896) 'Geschichte der Slavenapostel Konstantinus und Methodius' (1897); 'Lazaristen und Jesiuten' (1898); 'Leo XIII' (1899); 'F. H. Reusch' (1901); 'Das Kiever Höhlenkloster als Kulturzentrum der vormongolischen Russlands' (1904); 'Kirchenrechtliche und Kulturgeschichtliche Denkmäler Altrusslands' (1905); 'Staat und Kirche in Altrussland' (1908).

GOETZ, Theodor von, German painter: b. Lieschen, Siberia, 1826; d. 1892. He began as a genre painter, but in 1848 entered the army and during the Schleswig-Holstein campaigns filled his portfolio with sketches of march and battle. He thenceforward devoted himself to painting military scenes, and became renowned as a battle painter. He took part in the Franco-Prussian War of 1870–71, and painted many striking incidents of the campaign. Noteworthy is his 'Episode in the Battle of Sedan' (1875), one among many remarkable canvases which render him the Horace of Germany.

GOETZE, Frederick Arthur, American engineer: b. Jersey City, N. J., 17 April 1870. He was educated at Hoboken Academy 1877–82, Stevens Preparatory School 1882–85, Cooper Union, New York city 1885–87 and the Columbia School of Mines 1893–95. He was successively assistant superintendent and superintendent of buildings and grounds, at Columbia University from 1895 to 1907. From 1907 to 1916 he was dean of the schools of mines, engineering and chemistry there and since 1913 has served as comptroller and since 1916 as treasurer at the same institution.

GOFF, John W., American justice: b. Wexford, Ireland. He came to the United States when a child, was educated at Cooper Union, studied law under Hon. S. G. Courtney and was admitted to the bar in 1870. He was assistant district attorney of New York in 1888–91; was counsel for the law association in the investigation and prosecution of election frauds in New York, and for the Lexow senatorial committee of investigation of the administration of police affairs in New York. He was last recorder of the city of New York, 1894–1906; and in 1907 became justice of the Supreme Court of New York, in the First District, for the term 1907–20. He presided over the trials of the gunmen and of Charles Becker in the famous Herman Rosenthal murder case.

GOFF, Nathan, American legislator: b. Clarksburg, W. Va., 9 Feb. 1843. He was educated at Georgetown College and the University of the City of New York, and was admitted to the bar in 1866. He served in the Civil War in the Union army, rising from the rank of lieutenant to major. He was elected to the West Virginia House of Representatives in 1867; was United States district attorney in the district of West Virginia in 1868–81 and 1881–82. He served as Secretary of the Navy in the Cabinet of President Hayes in 1881, and was a member of the United States House of Representatives in 1883–89. He was United States Circuit Justice of the Fourth Circuit in 1892–1911; justice of the United States Circuit Court of Appeals in 1912–13; and in 1913 he was elected to the full term in the United States Senate.

GOFFE, gŏf, **William,** English regicide: b. Sussex, about, 1605; d. Hadley, Mass., about, 1679. He became apprenticed to a salter in London; in 1645 became a captain in the New Model, and served with distinction in the civil wars. He was one of the judges who signed Charles' death warrant, became a major-general, sat in the House of Commons, and in Cromwell's "other house," and was a staunch Cromwellian. Being excepted from the act of indemnity, in 1660, with his father-in-law, Gen. Edward Whalley, he fled to America; and they lay in hiding round about New Haven from 1661 to 1664, when they went to Hadley, Mass. There they lived for many years in seclusion; and it is there that, according to the well-known tradition, when the townsmen were called from the meeting-house to repel an Indian attack, and were standing irresolute, Goffe put himself at their head and drove off the foe, and then disappeared as suddenly as he had come. The genuineness of the story, however, is more than doubtful; but literary uses have been made of it by Scott, Fenimore Cooper and Hawthorne. His papers have been printed by the Massachusetts Historical Society. Consult Stiles, 'History of Three of the Judges of King Charles I' (1794), and Judd's 'History of Hadley' (Springfield 1905).

GOFFSTOWN, N. H., village in Hillsborough County, eight miles northwest of Manchester and 15 miles southwest of Concord on the Piscataquog River, and on the Boston and Maine Railroad. The village dates to 1748 and was incorporated in 1761. It is the seat of Saint Suselm's College and is known as a summer resort. It has manufactories of sash and blinds, bobbins and spools. Pop. 2,579.

GOG and MAGOG, a king and his nation mentioned in Ezekiel, and the book of Revelation ("the prince of Rosh, Meshech and Tubal from the land of Tubal"). Gog, king of the Magog people, represented the northern hordes, who were to invade western Asia (Ezek. xxxviii, 39). Probably Gog was the Gyges of the Greeks, Gyges being a typical name for kings reigning northwest from the Assyrians. The event predicted was the irruption of the northern nations into Syria. Gog and Magog are also the names given to two reputed giants of early British history, whose statues are erected in the Guildhall in London. The legend reported by Caxton with reference to these personages declares that they were the last two survivors of the sons of the 33 infamous daughters of the Emperor Diocletian, who, having murdered all their husbands, were sent to sea in a ship, and arriving in Britain and cohabiting there with demons, had a number of giants for their offspring. These giants, it is said, were conquered and brought prisoners to London, where they were kept chained to the gates of a palace on the site of the Guildhall. When they died their place was taken by effigies of them. Effigies called Gog and Magog certainly existed in London at a very early period, and they were sometimes brought out and placed on a conspicuous place to welcome a sovereign entering the city, as was done to Henry V in 1415; Philip and Mary in 1554; and Queen Elizabeth in 1558. The old effigies were burned in the great fire in 1666. The present figures of Gog and Magog, which are 14 feet high, were erected in 1708.

GOGEBIC RANGE. See IRON ORE DISTRICTS.

GOGERLY, Daniel John, English missionary and scholar: b. London, August 1792; d. Colpetty, Ceylon, 6 Sept. 1862. He became a Wesleyan preacher at an early age, and in 1818 went to Ceylon to take charge of the Wesleyan mission press at Colombo. In 1822 he became a missionary and was one of the first to preach to the natives in Singhalese. He devoted himself seriously to the study of the languages of the country and was the first European to give critical study to the language of the Páli, the native tongue of Buddha's country, Magadha. He was stationed at Madura in 1834 and there studied Páli under the native priests. He compiled a dictionary of Páli, 15,000 words, and induced the Buddhist priests to make copies of all their sacred books, with glossaries and annotations, a collection which at his death became the property of the mission. He was from 1822 one of the translators of the British and Foreign Bible Society, the Singhalese version being in a large measure the result of his labors, and he passed the entire version as editor and corrector. He was appointed superintendent of the mission in 1838. He made important contributions to the *Journal of the Royal Asiatic Society,* translated the 'Játakapata' ('Book of 500 Births of Buddha'), and wrote a polemic work against Buddhism 'Christiáni Pragnyapti; the Evidences and Doctrines of the Christian Religion: in Singhalese' (Colombo 1862). He was widely recognized as a master of Páli literature.

GOGGLER, or GOGGLE-EYE, names given colloquially to several fishes that have prominent eyes, as the rock-bass, the wall-eyed pike and a tropical crevalle. American gunners call a duck, the surf scoter, "goggle-nose," in reference to spectacles-like spots on its bill.

GOGOL, gō'gŏl, **Nikolai Vassiljevitch,** Russian novelist and dramatist, the father of modern Russian realism: b. in the government of Poltava, 31 March 1809; d. Moscow, 3 March 1852. From an early period he evinced a liking for the drama, endeavored unsuccessfully to establish himself as an actor, and at 19 entered the office of the domain of lands at Saint Petersburg as a copying clerk, becoming thereafter successively professor of history in the Patriotic Institute, a private tutor, and professor of history in the University of Saint Petersburg. In 1829 he published his first work 'Nights on a Farm near Dikánka,' and its remarkably vivid character drawing aroused widespread interest in its author. 'Mingorod' a collection of tales mainly illustrative of life and customs in Little Russia, followed in 1834. In 1836 he produced his great comedy, 'The Revizor' (inspector-general), the mordant satire of which drew a cry of distress from the dishonest and incapable provincial bureaucrats at which it was aimed, and its representation would certainly have been banned but for the Emperor Nicholas I, who appeared rather to enjoy the situation thus created. But the author was somewhat disconcerted by the feeling aroused by his comedy, and his health suffered in consequence. Between 1836 and 1848 he resided principally in Rome. In 1842 he produced his most famous work 'Dead Souls,' a novel without a plot, in which he again satirised public abuses and the barbarism of provincial manners. Laughter with tears in the background and a note of irony are the dominant notes of this remarkable novel, in which he introduced succession of types of all classes in Russia. His health was now failing; he became a victim of melancholy and hypochondria; his second volume of 'Dead Souls' was written, but in his alienation he consigned it to the flames. Fragments of a draft that have been recovered show how great was the eclipse that had clouded his intellect; for the characters are dull respectabilities. His last work 'Correspondence with Friends' (1847) furnished further proof of his ruined intellect: ascetic, mystical and reactionary, it is a moving and depressing recantation of his more virile work. He made a pilgrimage to Jerusalem in 1848. By temperament, imagination and intellect a true son of the steppes, Gogol's earlier works are assured of a permanent place in the literature of Russia. His principal tales have been translated by Hapgood (New York 1886); and 'The Revizor' by Mandell (New York 1910). See DEAD SOULS.

GOING, Charles Buxton, American engineer, author and editor: b. Westchester, N. Y., 5 April 1863. He was graduated at Columbia in 1882, and in 1896 became connected with the *Engineering Magazine*, of which he was managing editor in 1898–12 and editor in 1912–15. He has been editor of the Works Management Library since 1915. He has lectured on industrial engineering at Harvard, Columbia and New York universities and at the University of Chicago. He is a member of the American Society of Mechanical Engineers and corresponding member of the Canadian Mining Institute. Author of 'Summer-Fallow' with Marie Overton Corbin (1892); 'Urchins of the Sea' (1900); 'Star-Glow and Song' (1909); 'Methods of the Santa Fé' (1909); 'Principles of Industrial Engineering' (1911), etc.

GOITO, Italy, village of Lombardy in the province of Mantua, 11 miles northwest of Mantua, on the right bank of the river Mincio, and on the road to Brescia. It is located near a bridge, which has given it military importance, and it has been fortified as a bridge-head at different times. It has seen many battles, among them the victories of the Piedmontese forces over the Austrians 8 August and 30 May 1848. Pop., village, 737; commune, 6,702.

GOITRE, goi'tėr, an enlargement of the thyroid gland which may occur sporadically or be endemic. Isolated cases occur the world over. In the United States the disease is comparatively prevalent around Lake Ontario and in parts of Michigan. It is found endemically in the mountainous regions of Switzerland and Italy. The cause is unknown, although certain claims are made that the water is responsible. The symptoms of goitre consist of a more or less uniform enlargement of one or both lobes of the thyroid, causing a puffiness either on one side or both sides of the neck about the region of Adam's apple. When small, no inconvenience is caused thereby, but if the growth becomes extensive, pressure on the important structures of the neck may result in difficulty in breathing, and occasionally sudden death has resulted. Tumors of the thyroid glands such as carcinoma and sarcoma sometimes simulate goitre. One form of goitre, due to abnormal thyroid function, is known as Graves' disease. (See EXOPHTHALMIC GOITRE). Consult article on "Goitre" in Osler's 'Modern Medicine' (2d ed., Philadelphia 1914) and McCarrison, 'Etiology of Endemic Goitre' (London 1913).

GOKCHA, gŏk-chä', **GOKTSCHA**, or **SEVANGA**, sä-vän'gä a lake in Erivan, in Transcaucasia, Russia. It is 6,400 feet above the sea and has an area of about 540 square miles. A large number of small streams flow into it, but the outlet, the Sanga, which flows into the Aras, seems to convey only a small portion of the waters to the Caspian Sea.

GOLCONDA, India, a fortress and ruined city of the Hyderabad state, situated on a granite ridge, five miles west of Hyderabad, India. In its immediate neighborhood are the ruins of an ancient city, once the metropolis of the powerful kingdom of Golconda, which reached its height at the close of the 16th century and endured till 1687. The place itself is still strong; and about half mile to the north are the solid mausoleums of its former sovereigns. The fort is held by a small garrison from Hyderabad. Golconda is proverbially famous for its diamonds; but they were merely cut and polished here, as no diamonds are found in the vicinity.

GOLD (chemical symbol, Au, atomic weight, 197.3); a metal distinguished from other common metallic elements by its beautiful characteristic yellow color which it preserves untarnished on exposure to the atmosphere under nearly all conditions. Many alloys of copper with zinc, tin and aluminum have also a more or less golden-yellow color, and are used as substitutes for and imitations of gold, being sold under various fanciful names, such as Dutch metal, Mannheim gold, Abyssinian gold, etc. Some of the bronzes have also a golden color. None of these resist atmospheric action like gold, but some are fairly permanent under ordinary conditions. Pure gold has a high metallic lustre, but is inferior in this respect to steel, platinum and silver. The metal possesses a higher specific gravity than any common metal, but is exceeded in this respect by platinum. The specific gravity varies from 19.2 to 19.4, and the metal is thus one and one-half times heavier than lead and nearly twice as heavy as silver, bulk for bulk. Gold melts at 1,045° C., being somewhat less fusible than silver and more fusible than copper. It does not melt in a common fire. At high temperatures the metal is sensibly volatile, and in the intense heat of the oxyhydrogen blowpipe or electric furnace may be vaporized. The vapor is purple.

The pure metal is somewhat harder than lead, but softer than copper, silver, platinum, zinc or iron. It is consequently too soft, in the pure state, for the purposes to which it is generally applied. For practical application it is alloyed with copper or silver, and both these metals are often present. The former renders the gold redder and the latter paler than its true color. The proportion of gold contained in an alloy is expressed in degrees of fineness, or as "carats"; fineness is expressed in parts per thousand, for example 916.6, or decimally, .9166; the carat value of the gold is expressed in parts of 24, pure gold being 24 carats fine. Thus 9-carat gold contains 9 parts of pure gold and 15 of some alloy. Sovereign gold consists of 11 parts gold and 1 copper; guinea gold, of 11 parts gold, ½ part of copper and ½ part of silver. Standard and guinea gold are thus 22 carats fine (the legal standard for coins in the United Kingdom and colonies), and contain only two parts of alloy. The German, American and Italian standard is 21.6 carat, and is composed of one part copper and nine gold. The following table shows the relative amounts of gold and baser metal in alloys commonly employed:

Carats Fine	Pure Gold	Alloy	Fineness in thousands
24	24		1000.00
22	22	2	916.66
21.6	21.6	2.4	900.00
18	18	6	750.00
15	15	9	625.00
12	12	12	500.00
9	9	15	375.000

The lowest recognized standard is nine carat, but much gold of inferior quality is worked up into ornaments and commonly sold as real gold. Derby gold is also a common name for this poor material. In the United Kingdom articles of jewelry, plate, etc., are stamped with certain marks known as hall marks, or plate marks, as a guarantee that they have the quality they profess to have. Tampering with hall-marked articles is an indictable offense. Many specious imitations of hall marks are put upon sham jewelry, but always differ in some essential feature. Gold alloys of a red character are frequently colored. This consists in treating the article chemically in such a manner as to dissolve out the base metal constituting the alloy, leaving a covering of purer gold, paler than the original. For this purpose the articles are boiled with one part of salt, one of alum, two of saltpetre dissolved in four parts of water, for 20 minutes. Rolled gold is produced by applying thin sheets of gold to a plate of alloy and rolling down.

Pure gold has a tenacity of about seven tons per square inch, and elongates about 30 per cent before breaking. A wire one-tenth of an inch thick will support nearly 200 pounds. Its alloys with copper and silver are stronger. Standard gold has a tenacity of 18 tons (Austen), and extends 34 per cent before breaking. At very low temperatures this is greatly increased (Dewar). Gold is the most malleable of metals, and can be reduced to extremely thin leaves by hammering. (See GOLD-BEATING). Such leaves sometimes do not exceed [illegible] of an inch in thickness, and transmit green light, though presenting an unbroken metallic surface. This is best seen by mounting on glass. The extreme thinness and high lustre of the metal have led to its use as an illustration of the extreme divisibility of matter. A particle of gold weighing only [illegible] of a grain is readily visible to the naked eye. A grain of gold can be made to cover nearly 80 square inches of surface. The malleability of gold is seriously affected by the presence of minute quantities of arsenic, antimony, bismuth, lead, sulphur, selenium and tellurium. Of the last 0.2 per cent, and of bismuth 0.5 is sufficient to render the metal crystalline and brittle. Traces of the above elements unfit the metal for gold-beating and coinage. These are removed by passing chlorine gas through the molten metal, or by treating the molten metal with mercuric chloride (corrosive sublimate). By continued hammering the metal is slightly hardened, and must be annealed. Gold surpasses all other metals in respect of ductility. The extreme ductility of the metal is shown by the fact that wires less than [illegible] of an inch thick were obtained by Wollaston by encasing a wire of gold in silver and drawing down the compound wire. The silver was dissolved off by treatment with nitric acid. A length of 500 feet of such wire weighs only one grain. Gold wire is used for making gold lace. Gold is also extremely flexible and tough. Gold comes from the refinery in the form of bullion bars, and has to be assayed to determine its value. The bulk of it goes to a mint for coining. In the United States, on reaching the mint, the gold is melted with 10 per cent of copper and recast into ingots of a convenient size for coining. See COINAGE.

Chemical Properties.— Gold alloys readily with most metals. It is rapidly attacked by mercury, and dissolves in excess of that metal. If the liquid amalgam be squeezed through wash-leather a yellow pasty mass remains, which may be used in «wash» or «fire» gilding. This process, however, has been largely displaced by electro-gilding, in which the bath consists of the double cyanide of gold and potassium, and is used hot. The metal is unattacked by any of the simple acids, save selenic, but dissolves in any mixture in which chlorine, bromine or iodine is liberated. The common solvent is aqua regia, a mixture of one part nitric acid and three or four of hydrochloric acid. The chlorine liberated from this mixture converts the gold into the trichloride, an exceedingly soluble body of high tinctorial power, yielding yellow solutions. In the finely-divided state gold is dissolved by chlorine water, bromine water and iodine solution or tincture, the trichloride, tribromide and triodide being produced. It also dissolves in potassium cyanide solutions (in the presence of air) and in cyanogen bromide. These solvents are employed in the extraction of gold from its ores. Oxides of gold can be prepared with some difficulty. The monoxide is thrown down when caustic potash is boiled with gold chloride solution to which a little acetate of soda has been added. A trioxide (Au_2O_3), a dioxide (Au_2O_2), and a tetroxide (Au_2O_4) are also known. What is known as fulminating gold, $Au_2O_3(NH_3)$, may be prepared by adding ammonia to a solution of gold chloride or by steeping the hydroxide in ammonia. It is a green or brownish powder, which detonates violently when gently heated or when struck. Two classes of gold salts exist. Of the aurous salts, the principal are sodium auro-sulphite, auro-thiosulphate, the cyanide and potassium auro-cyanide. Of the auric salts, the principal are the trichloride and the chlor-aurates. Gold trichloride crystallizes from solution in dark orange-red crystals, $AuCl_3.H_2O$. It is extremely soluble in water, and volatilizes at 300° in a stream of chlorine gas, but is decomposed on heating to 200° in air with the formation of the monochloride and chlorine, and, at a higher temperature, of gold. It is soluble in ether, naphtha and essential oils.

The chlor-aurates are combinations of gold chloride with sodium, potassium and other alkaline chlorides. The best known are $KCl.AuCl_3.2H_2O$, and $NaCl.AuCl_3.2H_2O$, salts commonly sold as gold chloride for photographic purposes. Gold is precipitated from solution by most metals. Iron, copper and zinc precipitate it readily, generally in a more or less pulverulent form devoid of metallic appearance. Oxalic acid, ferrous sulphate, sulphur dioxide and sodium sulphite, carbon, grape-sugar and many organic reducing agents, precipitate the gold from gold chloride. In some cases the metal is so finely divided that it imparts a ruby color to the liquid and does not settle for months. Purple of Cassius is the fine purple pigment produced by treating gold chloride solution with a mixture of tin chlorides, that is, stannous chloride containing a little stannic salt. It is used in glass staining, pottery and enamel painting, and for coloring artificial gems, imparting a pink, rose or red color. The addition of tin chloride to the solution obtained by treating an ore with aqua regia and boiling off the excess acid is a delicate test for the presence of gold. Finely divided gold imparts to pottery and glass a color varying from pink to ruby. Gold resists chemical action to a greater extent than platinum or any other common metal, and in alloys protects base metals from the action of acids to a remarkable extent. Owing to the high specific gravity of gold (19.3) it is possible to roughly determine the richness of the alloy by taking the specific gravity of the article. This is impossible where platinum (specific gravity 21.4) is present in the alloy. The specific gravity of standard gold is 17.157, and of 18-carat gold 16.8.

Assay of Gold.— The touchstone is employed to determine approximately the quality of the gold. It is a hard, black, silicious or flinty slate known also as Lydian stone. Basalt and black Wedgewood ware are also employed. The metal to be examined is rubbed on the stone (any plating or coloring being first scraped off), and the streak compared with that made by needles of known composition differing from each other by one-half carat. The streak is also treated with nitric acid and a test acid, and the result of their action observed. Three or more sets of needles are employed, the chief being a gold-copper series, a gold-silver series and a gold-silver-copper series. Sometimes five sets are employed, in which the proportions of silver and copper are varied. The series to which the article tested belongs is determined by comparison for color, hardness and toughness, the latter being inferred from the dryness or greasiness of the streak. The streak is first treated with pure nitric acid (applied with a feather), which is afterward rubbed off. With brass and other spurious copper alloys the streak is completely and instantly dissolved, while poor gold leaves a very faint impression. Nitric acid does not affect any alloy above 15 carats fine. A test acid consisting of 98 parts nitric acid (specific gravity 1.34) and two of hydrochloric acid (specific gravity 1.173) is used if the streak has been unaffected by the nitric acid. Gold of 18 carats fine and over is not affected by this mixture in the cold. This method of testing is only used when a rough idea of the richness is all that is necessary for valuation purposes.

Accurate assays of gold alloys are made by wrapping a weighed quantity (either five grains or 0.5 gram) in sheet-lead, with sufficient silver to equal three times the weight of pure gold present. Lead to the amount of 34 times the weight of the sample is used for all alloys containing less than 50 per cent of gold, and less for richer alloys. The sample is dropped on to a bone-ash cup (cupel) previously heated to full redness in a muffle furnace. The copper and all base metals in the alloy are oxidized, and the oxides dissolved in the molten litharge formed by the oxidation of the lead added. The fused oxides are absorbed by the porous cupel, thus keeping the metallic surface clear, and at the end of the operation only silver and gold remain behind. After cooling, the button is rolled into a ribbon, annealed, coiled up and boiled first in nitiric acid of 1.16 specific gravity, and afterward in nitric acid of 1.26 specific gravity, to dissolve out the silver, and after washing the coherent cornet of gold is heated to dull redness in an annealing cup and weighed. The addition of silver in assaying is known as inquartation. It is necessary owing to the protective action exerted by gold on other metals.

Origin and Occurrence.— In nature gold usually occurs native, that is, uncombined. Less commonly it is found in combination with tellurium, as tellurides, of which calaverite ($AuTe_2$) is a well-known example. The native gold is often mixed with iron pyrites, the mixture being called auriferous pyrite. Both the tellurides and the auriferous pyrite usually occur in fissure veins in the rock, into which position they are usually believed to have been introduced by hot waters from deep seated igneous activity. The Cripple Creek district represents the type of the telluride deposits, and the Mother Lode in California the type of native gold and auriferous pyrite. When gold bearing veins of this sort are exposed at the surface the rock weathers faster than the gold. As the lighter rock particles are washed away the heavier gold remains behind associated with gravels in the form of placer deposits. California and Alaska have been the great placer districts of the United States. See PLACERS AND ORE DEPOSITS; GOLD MINING AND METALLURGY.

World Distribution of Gold.— Gold is very widely distributed, smaller or larger quantities being found in nearly every country. The ancients obtained gold from the Spanish Peninsula, Greece, Asia Minor and India. The Ophir of the Bible has been variously located. Possibly it was in East Africa. In more modern times Peru, Bolivia, Brazil, Chile, Mexico and other countries of South and Central America furnished immense supplies of gold after the discovery of America until about 1850. By far the greatest discoveries of gold were made during the 19th century. The discovery of the Californian placers in 1848, and of the Australian placers in 1851, produced a mad rush to the diggings. In 1858 gold was found in New Zealand, and in 1861 the Otago district became a large producer. Since then immense developments have taken place. Besides California, Colorado, Montana, Arizona, South Dakota, Nevada, Idaho and others of the Unted States have furnished, and still furnish, large supplies. and Alaska and the Philippines must also be added. British Columbia is an important source, both alluvial and quartz mining being followed. Canada has also entered the lists as a gold-producer, and the phenomenal deposits at Nome and in the Klondike region in the Yukon Basin continue to be a productive field. The rich finds in western Australia, in the Calgoorlie and Coolgardie districts, some years ago, placed that colony in the front rank as a gold-producer, while Victoria, South Australia and New South Wales have long been large gold-producing countries. In Victoria much energy in the development, more especially of "deep lead" mining, is being put forth. The Witwatersrand district of the Transvaal has sprung into importance since 1886, and Johannesburg is now the largest gold-mining centre of the world. Russia is also an important producer, the gold being obtained beyond the Ural Mountains. India also produces a considerable amount. Of the prospective gold fields the most likely are British Guiana, the hinterland of the Gold Coast, certain parts of China and East Africa. Gold has been found in several parts of the United Kingdom, principally around Dolgelly, in Merionethshire, in Sutherlandshire, in the Lead Hills, in the Wicklow Mountains and other places in Ireland. For world's production of gold see table under GOLD MINING AND METALLURGY.

The total gold production of the world from the discovery of America by Columbus to the year 1916 is estimated to be $16,616,991,763. Pure gold of this value would weigh about 20,500 tons, and occupy a space equal to 33,400 cubic feet. Graphically this amount could be represented by a solid circular tower of gold 20 feet in diameter and 138 feet high. The total yearly world production of gold since 1908 would have increased the height of such tower about three and one-half feet each year.

The world's stock of gold is variously estimated; it cannot be positively known, as much of it is in jewelry, tableware, etc., in the hands of individuals. Some idea of the old gold industry may be gleaned, however, from the fact that the "sweep smelters" of the United States, who handle sweepings of the precious metals from refineries, and old gold and jewelry, did a business of $22,000,000 in 1909. The gold leaf and foil industry is also credited with using about $1,000,000 of gold annually. The latest estimate of the world's gold, $9,000,000,000, is therefore probably below the real total. The United States, before the European War, was credited with nearly $2,000,000,000; Great Britain over $1,600,000,000; France, about $1,200,000,000; Russia, $1,000,000,000, and Germany, $1,000,000,000. Many have thought the German total an underestimate. Conditions have tended to increase the United States stock of gold, as this country's exports have vastly exceeded the imports, and America is now far in the lead as a money centre.

United States.— The total yield of the mines of the United States from the first official records of 1792 to the close of the year 1916 has been 185,226,085 fine ounces, valued at $3,828,957,200. The 1916 output of 4,479,056 ounces, valued at $92,950,300, was won from seven various sources, as follows: 63.30 per cent ($57,799,310) from dry or siliceous ores; 25.06 per cent ($22,881,663) from placers; 9.07 per cent ($8,286,290) from copper ores; 1.63 per cent ($1,486,754) from lead ores; 0.65 per cent ($589,950) from lead-zinc ores; 0.19 per cent ($171,624) from zinc ores, and 0.10 per cent ($92,039) from copper-lead and copper-lead-zinc ores.

In 1916 there were in active operation in the country 5,268 mines producing gold, 3,201 of these being deep or lode mines, and 2,067 placer mines. These figures include silver mines which also produce gold as a by-product. The largest number of mines in any one State is 852 in Colorado; 825 of these are deep mines and 27 placers. In Nevada there were 714 deep mines and 65 placer mines; a total of 779. In Alaska there were 697 mines; 650 being placers and 47 deep mines. California has 589 mines; 297 of them deep mines and 292 placer mines. Arizona has 527 mines; 504 deep mines and 23 placers. Montana has 393 deep mines and 120 placers; a total of 513. The 1916 output was produced chiefly (nearly 99 per cent) by 10 States, with Alaska and the Philippines. See table under GOLD MINING AND METALLURGY.

In California the gold production is in part from deep mines yielding hard quartz ores, and in part from placers. The deep mines in 1916 yielded $12,835,084, of which 7.2 per cent came from the ores of copper mines. The placers yielded $8,575,657, of which $7,769,227 was recovered by some 60 dredges operating in many sections of the State, but chiefly in Yuba, Sacramento and Butte counties.

In Colorado more than 92 per cent of the 1916 output came from deep mines; about 4 per cent from placers (worked by dredges), and the remainder from lead and copper ores. Two-thirds of the total yield came from the Cripple Creek district, where the Roosevelt tunnel was advanced 2,311 feet during the year; making its entire length at the close of 1916 about 22,000 feet.

In Alaska the output was nearly two-thirds from the placer diggings, less than one-fourth of the placer gold being gained by the dredges. A little over 1 per cent was recovered from the copper mines, and the remainder from deep mines — nearly all from the group of 13 low grade ore mines in southeastern Alaska.

Nevada's 1916 output was gained nearly all from deep quartz mines, and about half from the Goldfield and Tonopah districts.

South Dakota's output came almost wholly from low grade siliceous ores.

The balance of imports and exports of gold for the calendar year 1916 shows a gain by the United States of $530,197,307. The imports were chiefly of foreign bullion, $514,425,434; of foreign coin, $155,034,343; and gold in foreign ore and base bullion, $13,402,002. The exports were in largest items: United States coin, $106,903,188; domestic-refined bullion, $27,671,406; and foreign coin, $20,885,877. It is notable that the excess of imports over exports is $73,000,000 more than the entire world's production of gold for the year.

GOLD, Refining of. See ELECTROCHEMICAL INDUSTRIES.

GOLD-BEATERS' SKIN, a skin or membrane of great tenacity used in gold-beating (q.v.), and specially prepared from the outer coat of the cæcum of cattle. The intestines of 500 cattle are required to make a single packet or "mold" of gold-beaters' skin, the mold containing about 850 leaves, between which the gold to be hammered out is laid. See GOLD-BEATING.

GOLD-BEATING, the art of hammering gold into leaves of extreme thinness for the purposes of ornamental gilding. For this purpose pure gold is alloyed with small quantities of other metals according to the color required. Ten colors are recognized: red, pale-red, deep-red, orange, lemon, deep-pale, pale, pale-pale, deep-party, party, besides fine gold. In the deeper colors copper preponderates in the alloy, varying from ½ dwt. to ¾ dwt. per ounce, and no silver. The pale ones contain silver varying from a few grains to 1 dwt. per ounce. The middle ones contain from ¾ to a little over 1 dwt. of alloy, of which ⅔ is silver and ⅓ copper. Ordinary gold-leaf contains about 21 grains of alloy per ounce and is thus nearly 23-carat fine. The operations are conducted as follows: The metal is melted and cast into ingots, which are rolled out into thin ribands between polished steel rolls. Each ounce of gold is rolled to a length of about 10 feet, the riband being 1½ inches wide and 0.0015 to .001 inch thick. This is cut up into pieces, each weighing about 6 grains, so that 2 ounces — that is, a "beating" — yields 160 to 170 such pieces. These are packed between intervening sheets of vellum, some 3 inches square, the surfaces of which have been rubbed over with fine plaster of Paris — brime — to prevent the gold from sticking. A number of blank pieces of vellum are placed at the top and bottom of the pile and the packet is bound with straps of the same material. The cutch thus formed is beaten with a hammer weighing from 17 pounds upward, or by a power hammer, till the gold has been extended to the size of the parchment sheets. The packet is then unbound, the gold squares each divided into four by a steel knife and the pieces packeted between sheets of gold-beaters' skin (q.v.) about 4½ inches square. A number of blank skins are placed at both top and bottom. The 600 to 700 pieces are all put into the same packet and comprise what is called the shoder. The shoder is secured by slipping the pile into a parchment band and again into a similar one at right angles, and is beaten with a round-faced hammer weighing from 9 to 12 pounds, until the gold has extended across the skins. When the gold has filled the shoder each leaf is divided into four pieces with a strip of bamboo sharpened on the long edge. The 2,500 to 2,800 pieces thus obtained are packed in three packets between fine gold-beaters' skin, 5 inches square. Each of these packets constitutes a "mold." A large number of blank skins are placed at either side. The packet is secured as before and each mold is beaten with the "finishing" or gold hammer, weighing from 7 to 10 pounds, till the metal extends to the edges of the skins, and in some places flows over. When the beating is finished the mold is opened. Each leaf is then lifted deftly by long wooden tweezers, placed, with a sudden downward movement, on a leather pad dusted with brime, and from the central part leaves 3⅜ inches square are cut by means of two sharpened bamboo strips fastened parallel to each other. The leaves are placed by the tweezers in books of soft paper rubbed over with red ochre, red bole and brime to prevent the gold from sticking. If the leaf does not lie flat, a sudden puff of breath, well directed in the centre, lays it flat. Each book contains 25 leaves. Fine gold is more difficult to deal with than that containing a little alloy, owing to its liability to stick when the leaves touch. It, however, beats equally well. The leaf begins to transmit light when [illegible] of an inch thick. Ordinarily gold-leaf varies from [illegible] to [illegible] of an inch thick.

GOLD-BUG, The. 'The Gold-Bug,' by Edgar Allan Poe, belongs to the group which the author called Tales of Ratiocination. This type of story, which was virtually created by Poe and which is exemplified in the many detective stories written since his day, deals with the solution of a mystery, and has two climaxes — the first where the explanation is made known, the second where the method of discovering the explanation is revealed. It is usually told by a friend or semi-confidant of the person who evolves the solution, since by this device the author is able to present more easily details in the order necessary to produce the greatest effect. 'The Gold-Bug' tells of the discovery of buried treasure through the reading of a cipher memorandum and the scene is laid on an island near Charleston, S. C. As a tale it is remarkably well knit, and repeated readings will discover new instances of seemingly trivial details which are introduced because of their relationship to something in another part of the story. The gold-bug itself, which gives the title, is cleverly used to mislead the reader and to throw him off the true scent when the writer so desires. The work was first published as a prize story in the *Philadelphia Dollar Newspaper* in 1843 and appeared in the volume of Poe's tales issued in 1845. In Poe's lifetime, at least, it was the most popular of his prose pieces, but the author sometimes spoke of it rather slightingly. His other chief tales of ratiocination which may be grouped with it are the detective stories in which the character of Dupin appears — the 'Murders in the Rue Morgue,' the 'Purloined Letter' and the 'Mystery of Marie Rôget.'

William B. Cairns.

GOLD COAST COLONY, a British crown colony on the Gulf of Guinea, West Africa, bounded on the east by Togoland (German) and on the west by the Ivory Coast (French). Its coast line is about 350 miles; its area, inclusive of Adausi, Ashanti and the Northern Territories, is about 80,000 square miles; Gold Coast, 24,200; Ashanti, 20,000, and Northern Territories, 35,800 sq. miles. Pop. 1,503,386, including Europeans, 1,900 (Gold Coast, 853,766; Ashanti, 287,814; Northern Territories, 361,806). The native state of Ashanti lies inland, at the back of the central portion of the colony. The territories in the hinterland to the north of Ashanti were erected into a separate district, the Northern Territories, in 1897 and placed under the administration of a commissioner. The products are chiefly palm oil, gold, palm kernels, rubber, timber, etc. The revenue for 1914 was £1,331,713; expenditure, £1,755,850. The imports (including bullion and specie), £4,456,968; exports, £4,942,565. Public debt (1914), £3,464,118. Tonnage entered at ports (1914), 2,812,776 tons. Railways have been built from Seccondee to Coomassie (168 miles), and from Akkra to Mangoaze (40 miles). There are 1,653 miles of telegraphs in the colony. Chief towns, Akkra, the capital, pop. 19,585; Coomassie, 18,853; Cape Coast Castle, 11,364. The government includes a governor, an executive council and a nominated legislative council of nine. Trouble arose between the king of Coomassie, who had declared himself king of Ashanti in 1894, and the British authorities, and in 1895 an expedition was sent against him, under the command of Sir Francis Scott, which resulted in the submission of the king, who was afterward taken to the coast. The kings of Bekwai and Abodom also made their submission, and the country was placed under British protection, and a resident appointed at Coomassie. The Niger Convention, drawn up by the Anglo-French Commission sitting at Paris, and signed 15 June 1898, and the agreement of Germany 1899, settled the boundaries of the hinterland to the west and the north. Bona and Dokta were given up to France and the French had to concede Wa and other points to the east of the Volta, which had been occupied by them.

GOLD COINAGE IN THE UNITED STATES. The Constitution having assigned to the Federal government exclusively the right of coinage, the Secretary of the Treasury (Hamilton) in 1791 reported a plan for the establishment of a mint, and the Mint Act was passed 2 April 1792. In that act provision was made for the coining of gold, silver and copper — of gold eagles ($10), half-eagles ($5) and quarter-eagles ($2.50); of equivalents of the Spanish dollar, designed to contain 371 4/16 grains of pure silver (416 grains of standard silver); and at the bottom of the list, copper cents, although the decimal system was adopted in principle, and that called for dimes and mills as well as for dollars and cents. Now, if we overlook, as is indeed customary, the smallest subsidiaries, it may be proper to say that a «bimetallic» system was thus adopted. The ratio of gold to silver — the two metals then, and anachronistically still sometimes, called precious — was 15 to 1; and the standard of fineness of coins made chiefly of gold was 11/12. The mint was established at Philadelphia: the opportunity for coinage was both free to all persons and gratuitous, exactly as instruction and training at a public school, turning the children taken there into scholars, was free and gratuitous.

So the coinage laws stood until 28 June 1834, when the weight and fineness of gold coins were reduced (the weight of an eagle from 270 to 258 grains, and its fineness from 916.66 to 899.225 in 1,000). Here we note the beginning of — or the recognition for utilitarian purposes of — the amended ratio of gold to silver; since under this act it became approximately 16 to 1 instead of 15 to 1. On 18 Jan. 1837 the fineness was made 900 to 1,000, at which standard it has remained ever since. A sufficient explanation of those changes (1834 and 1837) is found in the statement that gold was underestimated at the mint under the older mint-ratio of 15 to 1; in consequence of which little or no gold was taken thither for coinage; moreover the old coins, minted during the first part of the century, were withheld from the general circulation.

A reversal of the above-mentioned policy of gratuitous coinage occurred 21 Feb. 1853, when a charge was imposed of one-half per cent for coining either gold or silver. Then, too, or during that mid-century period, important new coins were authorized: in 1849 the double-eagle and the gold dollar; in 1853 the gold three-dollar piece. Twenty years later (1873) a thorough revision of the coinage laws had, as a noteworthy result, the establishment of the one-dollar gold-piece of 25.8 grains, 9/10 fine, in the post of honor — that of the unit of value. Again, after an interval of about 17 years, the purchase of silver was increased under the Sherman Act of 1890, although the coinage of silver dollars was conditioned upon the number of them required to redeem the treasury notes issued in compliance with that act's requirements; and in the same year the coinage of the one- and three-dollar gold pieces was discontinued. But in 1893 the Sherman Act was repealed. Seven years later the so-called Gold Standard Bill (14 March 1900) was enacted «to define and Fix the Standard of Value, to Maintain the Parity of All Forms of Money Issued or Coined by the United States, to Refund the Public Debt, and for Other Purposes.» It provides that the dollar of 25.8 grains of gold, .9 fine, shall be the standard unit of value, and all forms of money issued or coined by the United States shall be maintained at a parity of value with this standard, and it shall be the duty of the Secretary of the Treasury to maintain such parity. All United States notes and treasury notes issued under the act of 14 July 1890 shall be redeemed in gold coin as above, and to secure this the Secretary of the Treasury is directed to set aside a reserve of $150,000,000 in gold coin and bullion, to be used for such redemption purposes only. If this reserve falls below $100,000,000 despite certain assigned methods of replenishing it, the Secretary shall pledge the credit of the United States by issuing bonds at not exceeding 3 per cent interest, payable quarterly, exempt from all taxation. This is not to interfere with the legal-tender quality of silver money already in circulation. As fast as silver dollars are coined under previous acts, an equivalent amount of treasury notes shall be retired and silver certificates issued instead. The coinage of subsidiary silver coins, and the recoinage of such as are out of circulation, are provided for. This act is not to prevent international bimetallism if it is found possible to secure a stable relation between gold and silver.

The total coinage, 1793-1911, was $4,304,288,083, divided as follows: Gold, $3,271,514,410; silver, $971,904,364; subsidiary or minor, $60,869,308. The gold coins minted have been (in millions): Double-eagles of the years 1850-1911, $2,350.0; eagles of the years 1793-1804, and again of 1838-1911, $492.1; half-eagles of the years 1793-1911, $370.0; quarter-eagles of the years 1796-1808, and again of 1821-1911, $38.1; dollars of the years 1849-1889, $19.8.

The coinage laws make careful provisions in relation to the abrasion of gold coins. Any coin which has been reduced in weight by natural abrasion more than one-half of 1 per cent below the weight required by law ceases to be legal tender for its face value. For example, a double-eagle, of which the standard weight is 516 grains, is not legal tender after losing more than 2.58 grains. Consult McLaughlin, A. C., and Hart, A. B., 'Cyclopedia of American Government' (New York and London 1914); and for lists of all countries wherein we find the gold standard or the gold exchange standard, and the gold units employed in those countries, with the value of each gold unit in terms of gold dollars of the United States, consult Gonzales, V., 'Modern Foreign Exchange' (New York 1914).

GOLD CONSPIRACY, The. A corner in gold created in the summer of 1869 by Jay Gould and James Fisk, Jr., the «absolute irresponsible owners of the Erie Railway.» Gould figured that if gold should rise to 140 or 145 the British market would buy breadstuffs here, and by this means he could induce the farmers to ship all their grain east. The movement of crops would turn over an enormous and continuous amount of freight to the Erie and Gould would enrich himself from both ends of his dealings. (For the results of the conspiracy see BLACK FRIDAY; also CORNER). Consult 'Testimony in the Gold Panic Investigation, Report No. 31, 41st Congress, 2d Session'; Gould's testimony before the Garfield Committee; Adams, H., «New York Gold Conspiracy» (in 'Historical Essays,' pp. 318-337, New York 1891); Boutwell, G. S., 'Reminiscences of Sixty Years in Public Affairs' (New York 1902).

GOLD-CREST, or GOLDEN-CRESTED WREN. The British name for one of the Kinglets (q.v.).

GOLD DREDGING. See GOLD MINING.

GOLD LACE, a kind of lace made of gold wire, flattened between two polished steel rollers into a ribbon which is twisted round a core of silk. In India «gold wire» used in the manufacture of gold thread is nearly always composed of pure silver with a thin coating of gold. But in European countries it is only the very best qualities of this wire which are made of unalloyed silver. A good quality of English gold thread is made from wire consisting of 1 part of copper added to 25 of silver, which is afterward coated with gold. But alloys of copper and silver in many proportions are used, some wire containing only 1 part of silver to 60 of copper. The silver, or alloy of copper and silver, is made into a rod 1½ inches in diameter, and then annealed and polished to prepare it for its coating of gold. This is laid on in the form of leaves of pure gold, and subjected, for the best qualities of wire, to the fire-gilding process — that is, the gold-coated rod is heated to redness on burning charcoal, which causes the leaf to adhere firmly. Rods so treated are next smeared with wax, and drawn through the holes of a steel draw-plate. (See WIRE AND WIRE-DRAWING). The wire is frequently annealed during the process of drawing, and this requires to be very skilfully done, or the golden tint of the surface is lost.

Gold wire for thread is generally drawn down to a size measuring 1,100 to 1,400 yards to the ounce of metal. Finer sizes reach the length of 1,800 to 2,000 yards to the ounce, and to attain this fineness the wire is drawn through perforated gems, such as diamonds or rubies. The fine wire, after being annealed, is flattened between polished steel rollers. Finally the flat wire, or rather ribbon, is wound over yellow or orange colored silk, so as completely to envelop it, by a spinning engine. The gold thread is then finished. Some of the best qualities of the metal covering or «plate» of this thread have 12 pennyweights of gold to the pound of silver or of alloy. Inferior kinds have as little as 2 pennyweights to the pound, and still cheaper sorts of thread are covered with flattened copper wire which has received a thin coating of electro-deposited silver, and this afterward receives, on the outside of the thread only, a still thinner electro-deposited coating of gold — two grains of the precious metal covering 3,000 square inches of surface. For this very cheap kind of thread yellow cotton is used instead of silk.

The only difference between gold and silver thread is that the thin coating of gold is wanting on the latter. Gold thread is used in the manufacture of military lace. This, however, is a woven substance and not true lace; but some real lace is made both of gold and silver thread. Both kinds of thread are also used for facings of liveries, and for ecclesiastical robes, altar cloths and banners. These and other fabrics are either embroidered or woven, but often only in part, with the thread. (See BROCADE; DAMASK; EMBROIDERY). Much of the «gold thread» used for theatrical dresses and decorations has only a covering of Dutch metal, and the «silver thread» in these is spun with a covering of a cheap white alloy, having a mere film of silver on the surface.

GOLD MINING AND METALLURGY. Gold is found in nearly all parts of the world and small amounts occur in ocean water and in many rocks. It is mostly in such minute proportions, however, that it cannot be profitably extracted and only the more concentrated deposits can be utilized and some of these only where natural conditions are favorable. It occurs in all formations from Archean to Quaternary and in part in association with various other metals as silver, copper, tellurium, lead and iron. The pure metal usually occurs in connection with silica or quartz, so that lode and vein gold mining is generally known as quartz mining. Gold has always been precious and difficult to obtain and never has been found so plentiful as to still the desire for its possession. In its search and exploitation, nature has generally demanded full toll in labor and effort. With early, primitive methods only the easily accessible, pure gold was obtained, but as machinery was developed and processes of extraction perfected, mining was extended to the less rich deposits. This development has progressed in other lines of mining so that within the last 25 years the production of iron, copper, coal and petroleum has been greater than the aggregate of all previous times.

History of Gold Mining.— The earliest records of gold mining are from Egypt, where pictorial rock carvings indicate the breaking up of ore by stone hammers, its grinding in stone mills, and treatment with water on stone tables. Shallow earthen dishes were used for final washings. Inscriptions on monuments indicate that gold washing was done as early as 4000

B.C. The Argonauts' search for the Golden Fleece has been explained by the fact that fleeces have been used effectively to catch fine gold in ditches and flumes, and when much gold dust adheres it makes a veritable golden fleece. The Argonauts are supposed to have made their quest in the direction of the famous gold deposits of Colchis, west of the Caucasus. Herodotus, 484–425 B.C., refers to several great gold mining centres in Asia Minor, and Strabo, 63 B.C., and Pliny, 23–79 A.D., mention gold mining in many different places. Pliny gives many details of ancient placer mining, which was extensive, for the water used was carried great distances by long ditches which crossed valleys in aqueducts. In places ledges were cut away to make room for troughs of hollowed-out logs. These and other ancient writers clearly indicate that gold mining was carried on in Egypt, Asia Minor, Italy, Greece, Spain, France and India before the Christian era.

History gives no reliable records of the outputs of these different gold fields, but doubtless they were small as compared with modern returns. Rome's wealth in gold increased as she took possession of the world, and finally reached a high figure, but during the barbarian invasions this accumulation of gold was scattered, and gold mining languished in the Middle Ages.

In the 13th century discoveries in the Alps, Transylvania and various parts of Spain revived production. In the 16th century the discoveries of gold in Mexico, Peru, Colombia and Chile gave new life and system to gold mining and since that time the gold production of the world has been estimated with a fair degree of accuracy. Considering, however, the great part that metals have played in civilization, it is astonishing that we have but meager accounts of the details of their obtainment. Agricola's 'De re Metallica,' in 1556, gave the first extensive and reliable information, with maps or illustrations, of any class of mining. This work, written in Latin (translated by Mr. and Mrs. H. C. Hoover), is the beginning of accurate mining and metallurgical literature. In this work appliances and methods used in both alluvial and lode mining are described and illustrated. It shows that the principles of many of the modern devices used in placer and other mining had long been known. A primitive stamp mill is described, also the use of quicksilver, retorting, assaying, melting and refining of gold and silver. The relative extent of ancient and modern gold mining is shown in the following table, which gives the output from the world's mines, with average annual progressive showings from 1493 to 1917, inclusive:

WORLD PRODUCTION OF GOLD, 1493 TO 1917, INCLUSIVE.

PERIOD	Total for period	Annual average millions	Remarks
1493–1600	$501,640,000	4.6	From 1493 to 1885 estimates are by Dr. Adolph Soetbeer; since 1885, by United States Director of Mint.
1601–1700	606,315,000	6.0	Start placer mining in Brazil, 1693.
1701–1800	1,262,805,000	12.6	
1801–1850	787,463,000	15.7	Start placer mining in California, 1848.
1851–1890	4,806,866,000	120.1	Start placer mining in Australia, 1852.
1891–1900	2,101,241,400	210.1	Start mining, Witwatersrand, South Africa, 1886.
1901–1910	3,780,703,900	378.1	Discovery of gold, Klondike, Alaska, 1897.
1911–1917	3,173,691,018	453.4	
Total	$17,020,725,318	40.0	

The contributions of the most important countries, with dates of initial operations, are approximately as follows:

Approximate date of starting operations	Country	Output (in millions)
1792*	United States	$3,913
1851	Australia	3,261
1886	Africa (Witwatersrand 2,572; all other Africa 691)	3,263
1745	Russia and Siberia	1,566
1537	Colombia	939
1693	Brazil	787
1521	Mexico	502
1858	Canada	412
——	China and Korea	281
1493	Austria-Hungary	216
1545	Chile and Bolivia	199
1884	British India	189
1533	Peru	128
1875	French, British and Dutch Guiana	150
1866	Venezuela	63
	Total	$15,869

Figures for the above table were obtained from De Launay's estimates to 1906 and United States Director of Mint's reports from 1907 to 1917, inclusive.

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* Gold mining in the United States started in the Appalachian States, which have produced over $50,000,000; gold was discovered in California in 1848.

Gold mining is divided into two classes, placer mining and lode or quartz mining.

Placer Mining.— Placer, known also as alluvial, or alluvium, mining, is the operation of washing gold or other valuable minerals from gravel or sand, which is mostly alluvium deposited by a stream or in a beach, or as talus. It has been estimated by De Launay that between 1848 and 1875, 87 per cent was thus obtained, but lode or quartz mining has increased so that in 1876 placer mining produced only 65 per cent; in 1890, 44 per cent; in 1905, 15 per cent. In the future, placer mining may become still less important. New deposits can be looked for only in sections which have been covered by ice, snow and marshy turfs in polar regions; in forests of the tropics; in deserts, high valleys and mountain chains. Further returns may also be obtained from gravels too poor to yield profit under present conditions. Placer deposits have been classified as shallow, deep, creek, hillside, bench, river bar, gravel plain (tundra), sea beach, lake bed and dry placers. Such deposits have been the easiest to work for nature has done the major part of the mining and reduction work, and man has the concentrates for further treatment. Nature's process was erosion, and her tools, clouds, rain, ice, snow, glaciers, rills, torrents and rivers. These have carved out valleys, built up flats and by attrition milled or ground up the materials, carrying away the softest and lightest. Gold, being the heaviest of known minerals, excepting platinum and a few other rare minerals, naturally works to the bottom of the streams and the coarser particles cling to the bed rock. The finer the gold dust the further it is carried down the river systems.

Most placer mining is done in the open and largely in connection with modern river systems. Some of the auriferous deposits, however, are covered by lava or other non-producting capping, which necessitates underground working tunnels, shafts, drives, slopes, etc. Such mining is known as drift or deep-lead mining and it has been done extensively in California and Australia. In most cases the pay dirt is in a few feet of gravel next to the bedrock, but in some such deposits yields high returns. After the gravel is mined and brought to the surface it is washed on floors connected with suitable sluice system. Auriferous gravel deposits with thickness of only a few feet or in banks of several hundred feet in thickness have been worked successfully. These gravels may contain boulders several feet in diameter, or pebbles graduating in size from a few inches in diameter to fine sands. The gold occurs in scales, grains or nuggets, and all particles are smooth and rounded, thus differing from vein gold which is sharp and angular, and often the particles, or «colors,» of gold dust are so fine and scaly as to defy ordinary devices of catchment. The nuggets have varied in size from small grains to the Australian «Welcome stranger,» weighing 2,520 ounces, valued at about $42,000. The largest nugget found in California weighed 280 ounces. In Russia the largest, weighing 96 ounces, was found near Miask. The Klondike has produced an 85-ounce nugget. The greatest proportion of gold recovered is medium and fine gold dust.

Prospecting Appliances.— The miner's pan, made of stiff sheet iron and flat-bottomed; the bateau, made of wood with conical bottom; and the horn spoon, cut out of ox horns, are used for testing the gravel and working the rich spots. These, with pick and shovel, and beans and bacon, were the old-time prospector's outfit. For small but rich deposits the cradle or rocker and Long Tom were long employed, but now they are rarely used.

Sluice and Sluice Mining.— The sluice is the mainstay of shallow placer mining. It is a long open box, made of rough boards usually in sections 12 feet long, with varying width and depth. The sides are protected from wearing by wooden liners renewed frequently. The bottom is protected and made effective for gold saving by a series of transverse or longitudinal riffles, or as in hydraulic sluices or flumes, with wood pavement of rounded blocks. The length varies with grade and other natural conditions favorable for disposal of tailings. The grades used vary from 2 inches to 20 inches per box (12 feet). Mercury is sprinkled in at the head of the sluice after washing has been in progress a short time. The charge of this metal varies with the richness of gravel and the magnitude of the work. A stream of water is turned in at the head of the sluice where the gravel is shoveled or dumped in. The amount of gravel mined and shoveled per man varies from 3 to 12 cubic yards per day. In sluice mining the sluices can be shifted to suit the mining or the gravel conveyed to the sluice by different appliances. At many workings long stationary sluices are constructed with drops to facilitate disintegration of the gravel and with undercurrents to classify the gravel and provide special treatment for the finer and heavier material. These devices are used mostly in hydraulic mining. The riffles are taken out periodically, the gold washed from the concentrates by rocker and pan and the mercury separated from the gold by retorting.

Hydraulic Mining.— Hydraulic mining was introduced in California in 1852, to deal with huge deposits of low-grade gold bearing gravel favorably situated for obtaining the water necessary for washing, and also for the disposal of tailings or débris. It is necessary that abundant water supply should be available. Hydraulic mining differs from large scale sluicing only in that instead of using pick and shovel for mining and dumping the gravel into the gold saving sluices, the water excavates the gravel and débris and conveys them into large and strongly constructed sluices. Water is brought to the gravel deposits in ditches and flumes from reservoirs or streams many miles distant and at such a height that it can be used under a head of several hundred feet. It is conducted in pipes to «monitors» which throw great jets of water on the gravel banks, some of which are from 300 to 400 feet high. The nozzles of the larger monitors are from 8 to 10 inches in diameter and throw a stream of from 3,000 to 5,000 cubic feet per minute. The gravel banks are prepared for the washing by a loosening by explosives. These are used in a T system of small tunnels driven into the banks, the entering one being used for tamping, and the cross drifts for the reception of a heavy charge of black powder or low-grade dynamite sufficient to shake up but not scatter the gravel. After the jets of water have played upon the banks for a while, large boulders and lumps of pipe clay remain which have to be drilled and shattered by explosives to allow the water to convey them to the sluices. To wash a cubic yard of gravel, from 500 to 1,000 cubic feet of water is required. Under most favorable natural conditions and suitable equipment, operating costs have been as low as three cents per yard, but for most deposits, large outlays for the purchase of rights, storage and conveyance of the water, and for sluices and tunnels, etc., are necessary to yield satisfactory results. In 1882 all hydraulic mining in California dumping tailings into the Sacramento River was enjoined as detrimental to the navigation of the river and the «slikens» or fine sediment assumed injurious to the farm lands in the valley. This has been a serious set back to hydraulic mining.

Gold Dredging.— Gold dredging originated in New Zealand and Australia as early as 1865, but the endless bucket chain system was not started there until 1882. In Montana this system was started in 1894, and in California in 1896. The dredges were used first in active running water, as in river beds, and later to work ground in benches or below drainage not profitable or possible by the sluice system.

A gold dredge is a flat-bottomed boat, with the forward part of the hull so divided as to form a well in which the ladder and bucket chain may be raised or lowered. Upon the boat is mounted a digging ladder and chain of buckets; a disintegrating and screening apparatus; a system of sluice and other gold saving devices; pumps, anchoring and moving arrangements; a stacker for the disposal of the coarser gravel, and motors, winches, gearing, etc. The early dredges were small and driven by steam power, but the best ones now use electric power and have been so enlarged and perfected that they have been able to dig gravel from 50 to 80 feet below water level at the rate of from 300,000 to 400,000 cubic yards a month, with an operating cost of from three to six cents per yard. The outlay for such dredges is from $300,000 to $500,000. The main dredging fields now are California, Alaska, Colombia, New Zealand and Australia. The output from all dredging operations in the United States, from the start to the end of 1916, amounted to $120,103,117. In Alaska, sluice dredging, as also drift mining, is impeded and made costly by the necessity of thawing frozen ground by jets of dry steam which is applied through pipes, also called points, driven in the gravel.

Before starting dredging, the ground is prospected by shallow pits or drilled by Keystone drills, a light self-contained machine capable of boring a six-inch hole to moderate depths and of saving samples of the material passing through. In placer mining the most valuable minerals associated with gold are platinum, found chiefly in Russia, Colombia and California, and tin (cassiterite), found principally in Australia. The most abundant mineral association, however, is magnetite (black sand), garnet, zircon (white sand) and monazite (yellow sand).

Lode, Vein or Quartz Mining.— The principles and methods of mining lode gold ores apply as well to those of silver, copper, lead, tin and zinc. The first requirement is accurate sampling and assaying, valuation of the deposit and the determination of the scale of working; second, prospecting, including diamond drilling, temporary shafts, winzes and raises; and third, developing and exploiting the deposit underground. This brings in its train the consideration of the size and nature of opening into the mine, whether by tunnel or entry, or incline; rectangular, round or octagonal shafts; also whether cars, skips, cages, kibbles or buckets should be used in the hoisting ways. The system of stations involves loading devices, levels, cross-cuts and drifts from the main openings. For exploitation it is necessary to consider the winzes, raises, and advisability of overhand, underhand, long wall, rill or shrinkage stropes; sub-level, top-slicing or other caving systems; and whether the support of the ground should be by pillars, square set timber or stalls, waste rock, cribs of timber and waste and tailings.

In the matter of mechanical equipment, the type of hoisting or winding engines and the probable output and depth of their working has to be taken into account, as also the advisability of the use of steam, electricity, water or gas, as source of power. It is also necessary to consider whether direct steam pumps, rod driven pumps (Cornish), hydraulic, compressed air or electrically driven pumps, are preferable. Bailing by tanks attached to the winding engines is often expedient and in some cases gives excellent results. In underground transportation or tramming, the problems of the use of man power, compressed-air locomotives, electric-storage locomotives and electrical haulage present themselves. Drilling and explosives are vexed subjects. Hand drilling until recently was the method most in use; now most of the boring is done by air drills, the two main types being, first, the use of the drill as the piston extension, and second, the action of the piston as a hammer striking the head of the drill. The sizes of the piston and weight of the drills are matters of much import. Air compressors are of divers makes and are driven either by steam, water, electric or gas power. Great diversity of opinion exists as to grades of explosives to be used in different deposits. The advisability of the systems are greatly dependent on the nature and class of the deposit and the economic conditions prevalent in the region. These and many other details connected with the technique of mining are more fully treated and explained under mining (q.v.).

Treatment of Gold Ores.— The treatment of gold ores depends greatly upon their richness and associations with other minerals, their gangues and rock embediments and the economic conditions in the district in which the work is performed.

An outline of the ordinary reduction and recovery can best be considered under the following headings: Elimination of waste; conveyance to mill or reduction plant; rock breaking; crushing; amalgamation; concentration; chemical treatment, chlorination, cyanide; treatment of amalgam, zinc precipitates, bullion, refining. The site of a reduction plant is influenced by the topography of the country, the relationship of mine, mill and water supply, also transportation facilities. The ideal situation is when the mine outlet and mill are close together upon a hillside, with slope allowing gravity movement of the ore pulp and tailings. This is rarely obtainable, but excellent results can be obtained on flat ground with suitable machinery.

Elimination of Waste.— The elimination of waste before treatment was in early practice largely effected by hand-picking the ore on dressing floors; in more modern practice the coarser ore, after screening, is dumped upon revolving annular tables, or belts, where it is washed and the hand-sorted ore scraped or dumped into bins or rock breakers. In this way often a large per cent of the rock hoisted is not sent to the mill and the grade of the ore treated is correspondingly raised. This policy of sorting is of doubtful benefit when the cost of reduction is small, as there must always be some gold in the waste selected, as also added cost from the sorting. In some mines sorting and packing of waste is done underground.

Conveyance to Mill or Reduction Plant.— The mills are often some distance from the mines and made to serve several shafts, outlet adits and tunnels, or a mill may be consolidated with the hoisting appliances of one shaft or tunnel. The mines, on the other hand, may be far from the mill and various methods of transportation, as pack animals, carts, wagons, tram cars, gravity inclines, aerial conveyors, locomotives and electrical haulage, may be resorted to. At some mines a head frame of a shaft, or the dump from a tunnel, and a mill have been joined together so that the mine hoist dumps the ore at such a height that it can be sorted, the rock and ore broken in rock breakers and the ore run by gravity direct into the mill bins.

Rock Breaking.— There are two classes of rock-breaking machines in general use — jaw breakers with reciprocating motion and the gyratory crusher. The breakers are often placed over the mill bins, sometimes in the head frames of the shafts, now more common in plants to themselves, and the broken rock conveyed to the mill bins by cars or conveyors. In the larger size of crushers the rock as dumped from skip, or car, is led to them in chutes. In some installations there are two sizes of crushers so that the ore can be finer crushed before reaching the stamps or other fine crushers. In some mines the primary rock breakers are placed underground.

Crushing.— The earliest crushing machine in use in America was the Arrastra, being introduced at the same time as the Patio process, about 1557. It is an apparatus for grinding and mixing ores by means of heavy stones dragged around upon a circular bed paved with stones, and charged with mercury. It was cheaply constructed and worked by animal power; it ground very finely and often gave very high extractions. Except for prospecting, it is almost obsolete, as the output from it is so limited and modern crushing machinery so improved. The stamp battery is the most common form of fine crusher. A stamp is a heavy iron or steel pestle, raised by a cam keyed on a horizontal revolving shaft and let fall by its own weight. They are ranged in line in groups of five, having a mortar box in common. The box is made of heavy cast iron, especially strong and solid at the bottom. The pestle is shod with a removable iron or steel shoe, and the bottom of the mortar clad with iron or steel blocks known as dies. Water and ore are fed into the mortars continuously, the water by pipes and the ore by automatic feeders. The blows of the stamps splash the water and pulp against screens set in the side of the mortar box and the ore after being crushed to the required size thus ejected. The height of drop of the stamp is usually five to seven inches, the number of drops per minute about 90 and the size of screening or perforated plates varying from 40 mesh to the inch to perforations as large as one-quarter inch. The stamps vary in weight from 100 to 2,000 pounds, only the very early stamps were as light as 100, and only South African as heavy as 2,000. The most common weight is between 1,000 and 1,500 pounds, and with crushing capacity between three and five tons to the stamp in 24 hours. The heavy stamps with one-quarter inch screen apertures and supplemented by fine grinding tube mills have crushed 20 tons to the stamp. Crushing rolls, Huntington mills and ball mills have been used to replace the stamp mill and under certain favorable conditions have given excellent results, but as a whole the stamp mill may still be considered the most economical and satisfactory device.

Amalgamation.— The pulp or discharge from the mortar, or tube mill, passes over copper plates. These plates are commonly 15 feet by 4 feet 9 inches and given a grade of one and one-quarter inches per foot, sometimes made shorter in two or three sections with slight drops between. The plates are treated with quicksilver and dressed so that the gold amalgam formed on the plates is made use of to catch more gold, the quicksilver is fed partially into the mortar which is sometimes supplied with inside plates, and also the outside plates are sprinkled with quicksilver, the amount depending upon the amount of gold in the ore. The amalgam on the plates should be neither too hard nor soft. Cleanups of amalgam are made daily, and the amalgam squeezed in cloths or chamois skins so as to eliminate the excess quicksilver. The amalgam is then stored for periodical retorting.

The amount of recovery by amalgamation varies from 90 per cent for very rich free-milling ores to only 30 or 40 per cent for complex ores; the average for the Witwatersrand conglomerates was about 60 per cent. A higher percentage of amalgamation is obtainable by finer grinding and longer contact with mercury, as by the Arrastra and Patio processes employed in South America, and amalgamation pans.

Concentration.— The mill pulp after passing over amalgamated plates, or sometimes directly from the battery, is subject to classification and concentration of the small percentage of the coarse and heavier materials which carry much of the remaining gold. The amount of gold so obtained is dependent upon the character and treatment of the ore and varies greatly. In some cases concentration is omitted and the ore directly treated by the cyanide process. In early practice, after amalgamation, concentrates were obtained by the use of rough blankets placed on inclined planes and frequently washed and renewed. The practice of concentration was further developed by the use of convex and concave buddles and the use of large areas of canvas on inclined floors frequently hosed down and cleaned. More perfect concentration is now obtained by the use of Frue and other vanners, on which concentrates are caught and subjected to slow constant longitudinal and slight rapid side-shake movements. Percussion tables, such as the gilt-edge concentrator, with an end bump, were often used; as also Wilfley tables, with riffles and smooth surface, and longitudinal jerking action; and Hartz and other jigs, especially useful for coarse-crushed ore. Hydraulic classifiers are used for obtainment of concentrates as well as for the separation of sands and slimes for cyanide treatment. There are several kinds in use — the Spitzkasten, an inverted pyramid box into which the pulp stream enters at one side and is discharged at the other, and the coarser material drawn off at the apex. The regulation of the settlement is effected by baffles, the angle of sides of the box and the discharge valve at bottom. The Spitzlutte is similar in principle to the Spitzkasten, but with the addition of an ascending current of water at the apex and modification in the dimensions of the pointed box. The cone classifier works on the same principle but with perfected details. The Dorr classifier is in the form of an inclined trough, open at one end, in which mechanically operated rakes are placed to remove the heavy material as fast as it settles, the liquid and slimes overflowing at the closed end.

Flotation.— The flotation process is the most modern, new and interesting method of concentration. The Elmore process, in 1897, demonstrated on a practical scale that by using residuum oil in the crushing of ore, sulphides and metallic particles could be floated on top of a pulp stream, skimmed and treated as concentrates, and the earthy and stone materials kept at the bottom and discharged as tailings. Many improvements and innovations have since been made and the process is being extensively used. The fundamental principles are film suspension, oil buoyancy and bubble levitation. The latter phase depends upon the aid of bubbles of gas which by attaching themselves to particles of minerals buoy them to the surface. For a detailed explanation of the various devices of flotation, special literature should be consulted.

Chemical treatment, chlorination, cyanide. — The chlorination process — one of the early attempts at chemical treatment of gold ores — has been extensively used since 1850 for extracting gold from concentrates. It has practically given place to the cyanide process. The Plattner process, originated in Freiberg in 1848, is the best known. It depends on the fact that chlorine readily attacks gold and forms soluble gold chloride, which is precipitated by suitable reagents. It requires that the sulphide concentrates should be subjected to a dead roast in reverberatory furnaces before the chlorine treatment is given; it also requires that the vats have removable tops that may be closed and sealed. Besides the Plattner there are several barrel chlorination processes, the best known being the Thies. In this process chlorine gas is generated inside the barrel by means of bleaching powder and sulphuric acid, and a gas pressure of a few pounds to the square inch maintained.

The cyanide process is based on the facts that dilute cyanide solutions will dissolve the precious metals from their ores when finely crushed, and that when gold in solution is brought in contact with zinc it will be precipitated. It is also possible to separate the gold from the solution electrically by using iron anodes and sheet lead cathodes. The Siemens-Halske process on this principle achieved some success, but is unable as a rule to compete commercially with zinc precipitation. Patents for cyanide extraction were taken out in Great Britain as early as 1840 and in the United States in 1867, but it was not until 1887, through the investigations and experiments of J. S. McArthur and R. W. Forrest, that the cyanide process showed practical results. These investigators demonstrated the benefit of using very weak solutions of cyanide and the precipitation on zinc shavings confined in boxes through which the solution flowed. McArthur and Alfred James, in South Africa, worked out a successful system of economic treatment, which, though since greatly extended and improved in detail, embodied the basic fundamentals. The benefit of fine grinding or crushing was clearly realized by them in the early days, though not so completely applied as later.

The cyanide process has been a great help in the extension of gold and silver mining. On the Witwatersrand it has been especially beneficial in that the gold occurs in such fine particles that extraction of only 55 to 65 per cent could be obtained by amalgamation, with but small addition by concentration and chlorination. By amalgamation and cyanide treatment, however, about 94 per cent is now obtained. Most gold and silver ores are amenable to cyanide treatment, though antimony combinations are very detrimental and the association with tellurium may require preliminary roasting or very fine grinding. The field of the cyanide process has constantly widened since its introduction in South Africa in 1890, and there have been many developments in its details. The flow sheets of the mills and cyanide works vary in the same as well as different mining districts. The pulp is classified into sands and slimes and separate treatment given to each. For details of the process see works mentioned in references.

Treatment of Amalgam, Zinc Precipitates, Bullion, Refining.— The gold in the amalgam is separated by retorting; that is, mercury is vaporized by heat, and condensed in cooled pipes. The gold is left in the form of a yellow sponge which is melted with suitable fluxes in graphite crucibles and poured into bullion molds. Gold bullion contains some silver, copper and other metals, which are separated at mints or private refineries, by sulphuric acid, chlorine gas or electrolytic treatments. See ELECTROCHEMICAL INDUSTRIES.

The zinc precipitate is in the form of impure brown powder or filter-press cakes. It is treated in various ways; viz.: (1) By direct fusion with fluxes; (2) roasting followed by fusion; (3) treatment with acid, followed by fusion with or without roasting; (4) reverberatory furnace, lead fusion and cupellation; (5) blast furnace, lead fusion, then cupellation. Both rich gold ores and concentrates, especially when associated with lead or copper, are treated directly in smelters. Considerable gold is also recovered from copper and lead smelting in which gold is a small by-product and incidentally recovered in refining.

Geographical Distribution of Gold Mining. — The following table gives the distribution of gold production. It also indicates that the output has reached its zenith during the past five years, and now has a downward tendency. The output for 1917, given at $423,590,200, is approximately 6.7 per cent less than the output for 1916. The table gives the percentage of production for all countries for 1913, and shows that the territory of the Entente Allies produced 91.3 per cent and that of the Central Powers only 0.6 per cent of the world's gold.

The greatest gold mining district in the world is the Witwatersrand, Transvaal, South Africa. The principal mines are in an area about 30 miles long by 5 miles wide. The ore is in conglomerate beds included in a sandstone and quartzite succession, which though somewhat faulted is so uniform as to permit one mine opening into another. Although the conglomerate deposits were originally of placer origin, the sharp crystalline nature of the gold indicates secondary deposition or reduction. Some shafts are more than 5,000 feet deep. Production in 31 years has been about $2,500,000,000. The yield per ton has decreased from $12 in 1890, at cost of $10.25 per ton, to $6.40 in 1916, with cost of $4.50 per ton. The total dividends have been about 24 per cent of the output. The largest force employed has been about 200,000 natives and 26,000 Europeans.

COUNTRIES	1913	Per cent	1914	1915	1916	1917
North America:						
United States	$88,884,400	19.3	$94,531,782	$101,035,700	$92,590,300	$83,750,700
Canada	16,598,900	3.6	15,983,004	18,977,901	19,235,000	15,200 000
Mexico	19,308,800	4.2	4,788,175	6,559,275	7,690,700	9,000,000
Central American States	2,721,700	.6	2,393,190	2,970,271	3,517,600	3,122,000
South America:						
Argentina	2,600	.0	...	...	15,300	4,600
Bolivia and Chile	175,000	.0	202,770	814,418	301,000	315,000
Brazil	2,254,700	.5	2,139,803	2,424,515	2,890,000	2,958,000
Colombia	2,971,700	.6	4,678,587	5,453,148	6,173,900	6,200,000
Ecuador	406,500	.1	346,853	545,674	560,000	710,000
Peru	492,300	.1	1,022,125	1,109,891	1,267,400	1,300,000
Uruguay	29,900	.0	15,276	11,836	12,000	10,000
Guiana:						
British	1,353,500	.3	1,126,500	923,892	660,700	600,000
Dutch	470,400	.1	503,400	449,054	438,200	400,000
French	3,050,600	.7	1,959,793	1,959,793	1,600,000	1,500,000
Venezuela	444,800	.1	612,796	1,395,349	1,269,900	637,000
Europe:						
Austria-Hungary	2,179,300	.5	200,744	1,392,465	1,000,000	1,000,000
Finland	900	.0	...	...	...	...
France	2,127,400	.5	1,400,000	1,400,000	1,000,000	700,000
Germany	135,600	.0	...	...	...	...
Great Britain	17,900	.0	20,238	19,266	5,700	5,000
Greece	...	.0	...	...	...	...
Italy	17,200	.0	32,145	2,295	2,000	2,000
Norway	...	.0	...	...	...	...
Portugal	2,300	.0	2,336	661	...	...
Russia and Siberia	26,507,800	5.8	28,586,392	26,322,746	22,500,000	18,000,000
Serbia	328,000	.1	116,000	...	...	...
Spain	...	.0	...	...	...	...
Sweden	17,600	.0	54,304	25,323	12,200	10,000
Turkey	500	.0	475	475	...	...
Australia:						
British New Guinea	377,200	.1	377,757	...	...	...
New South Wales	3,093,200	.7	2,573,788	2,738,958	2,235,600	...
Northern Territory	64,500	.0	52,341	20,351	12,400	...
Queensland	5,493,200	1.2	5,134,779	5,161,911	4,447,800	...
South Australia	135,500	.0	145,778	125,701	160,600	...
Victoria	8,990,800	1.9	8,541,972	6,802,359	5,305,500	35,945,500
Western Australia	27,165,700	5.9	25,487,891	25,014,928	21,941,000	...
New Zealand	7,102,700	1.5	4,712,226	8,740,567	5,836,000	...
Tasmania	690,400	.2	542,491	383,402	326,400	...
Tatua (Borneo)	...	.0	...	...	210,500	...
Asia:						
British India	12,178,000	2.6	11,378,400	11,522,457	11,206,500	10,756,800
China	3,658,900	.8	3,658,900	2,804,692	3,100,700	3,600,100
Chosen (Korea)	3,582,500	.8	3,309,870	3,739,477	4,122,400	4,444,000
East Indies:						
British	1,352,000	.3	(a)	(a)	(a)	(a)
Dutch	3,387,100	.7	4,480,853	3,100,000	3,000,000	2,818,000
Federated Malay States	282,400	.1	269,147	351,527	327,900	342,300
Formosa (Taiwan)	814,600	.2	952,806	1,143,017	1,001,200	1,033,000
Indo-China	74,700	.0	66,419	43,659	65,600	50,000
Japan	3,614,400	.8	4,679,358	5,386,066	5,185,600	4,562,200
Siam	56,500	.0	...	...	...	...
Africa:						(b) 2,935,656
Abyssinia	497,200	.1	...	...	...	...
Belgian Kongo	916,600	.2	1,029,189	1,029,189	2,315,500	2,000,000
Egypt	95,100	.0	126,842	144,910	130,000	...
Portuguese East Africa	...	.0	...	...	231,900	...
French East Africa	...	.0	43,414	43,414	31,300	...
German East Africa	253,200	.1	...	...	...	...
Madagascar	1,256,200	.3	1,169,055	1,381,354	965,000	1,000,000
Rhodesia	14,274,700	3.1	17,663,686	18,915,324	19,232,200	14,988,600
Sudan	192,700	.1	...	...	...	...
Transvaal, Cape Colony and Natal	181,885,500	39.5	173,559,940	188,033,156	192,182,900	186,254,256
West Africa (Nigeria, Gambia, Gold Coast and Sierra Leone)	7,955,300	1.7	8,404,670	8,304,551	7,860,100	7,435,488
Total	$459,941,100	100.00	$439,078,260	$468,724,918	$454,176,500	$423,590,200

(a) Included in Dutch East Indies. (b) African production undistributed.

The United States, including Alaska, ranks next to South Africa in production. The output in 1916 was $92,590,300. Of this about 25 per cent was from placer mining and more than half of which was from dredging operations. Yields and costs vary in different districts. The greatest producers are mines of low or moderate values in large, massive ore bodies, with favorable conditions for economical working. A conspicuous example is the Homestake Mine in South Dakota, which, since 1875, has produced over $147,000,000, with a yield under

$4 per ton, and costs of $2.50 to $3 per ton. Dividends of 27 per cent of the output have been paid. The Alaska Treadwell group of mines, on Douglas Island, Alaska, and the Alaska Gold and Alaska Juneau, which are situated opposite, have the record of the world for the lowest lode-mining costs. The Treadwell group treated 25,000,000 tons, yielding $2.37 per ton, with total costs of $1.42 per ton. The Alaska Gold in 1916 produced about 2,000,000 tons, with a yield of 97 cents, and operating costs of 73 cents. The Portland, a telluride mine, in Colorado, where working costs are high, has produced $40,000,000 worth of ore, averaging $27 per ton, and declared dividends of only 20 per cent. The phenomenally rich ore of the Goldfield Consolidated, Nevada, though producing $50,000,000, has fallen in seven or eight years from $38 per ton to $7.52 per ton in 1916.

The yearly production of gold in the United States, by States, from 1914 to 1917, is as follows:

PRODUCTION OF GOLD IN THE UNITED STATES, BY STATES, 1914 TO 1917, INCLUSIVE.

COUNTRIES	1914	1915	1916	1917	Rank
Alabama	$12,300	$5,100	$7,400	$2,200	18
Alaska	16,547,200	16,710,000	16,124,800	14,671,400	3
Arizona	4,568,900	4,555,900	4,092,800	5,180,600	6
California	21,251,900	22,547,400	21,980,400	20,929,400	1
Colorado	19,902,400	22,530,800	19,185,000	15,974,500	2
Georgia	16,800	34,800	20,400	6,500	15
Idaho	1,187,200	1,170,600	1,058,300	754,800	12
Montana	4,143,600	4,978,300	4,328,400	3,673,200	7
Nevada	11,536,200	11,883,700	9,064,700	6,932,500	5
New Mexico	1,219,100	1,460,100	1,350,000	1,085,400	11
North Carolina	130,300	170,700	23,000	10,800	14
Oregon	1,589,400	1,867,100	1,901,500	1,687,300	9
South Carolina	3,200	3,600	300	1,700	19
South Dakota	7,334,000	7,403,500	7,471,700	7,372,900	4
Tennessee	6,400	6,800	5,700	5,500	16
Texas	8,800	1,800	500	100	22
Utah	3,377,000	3,907,900	3,859,000	3,522,100	8
Virginia	300	500	500	1,300	20
Washington	587,800	461,600	580,600	488,200	13
Wyoming	6,700	13,900	20,200	3,700	17
Other States	200	....	300	400	....
Total	$93,429,700	$99,714,100	$91,075,500	$82,304,500	....
Porto Rico	2,800	700	600	100	21
Philippines	1,099,300	1,320,900	1,514,200	1,446,100	10
Total	$94,531,800	$101,035,700	$92,590,300	$83,750,700	....

The richest gold and silver lode in the world was the Comstock Lode, which opened in 1859 and worked extensively for 30 to 35 years, and produced over $470,000,000, of which about $190,000,000 was gold. The working costs were very high. Mount Morgan Mine, in Queensland, is a great gold and copper deposit. It was started as a gold mine in 1882 as an open-cut working, in a siliceous gossan capping of a copper sulphide deposit. It is now being largely exploited for copper. It has yielded in dividends about $43,000,000. Its costs have been high. The Waihi Gold Mine, in New Zealand, started in 1887, is still working, and has yielded over $30,000,000. It was one of the first mines to successfully use the cyanide treatment. The Mysore mine in India has worked since 1880, has been a big producer for a narrow lode and is still operating with shafts over 4,000 feet deep. The deepest and longest-worked gold mine in the world is the Saint John del Rey, Brazil, worked since 1830, and which has attained a depth of 5,900 feet, vertically.

From the 4th to the 15th centuries «Chemia,» or alchemy, flourished and was busied in the attempt to transmute base metals into gold and silver. The alchemists, though they failed in their main object, laid the foundations for the science of chemistry and improved the metallurgy of the metals. The gold seekers have been instrumental also in the discovery and opening up of lands in new countries and the spreading of knowledge. The gold miner has blazed the trail for civilization in many lands. It has been well said, «Trade follows the flag, it is true, but the flag follows the pick.»

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GOLD ORES. See GOLD MINING.

GOLD OF PLEASURE, an annual cruciferous plant (*Camelina sativa*), with abundant yellow flowers, called «cameline» by the French and «dotter» in Germany. It is a weed in lint-fields, but is also cultivated in parts of Europe for the sake of the oil in its seeds. Its seeds and oil-cake are, however, inferior to those of flax, rape or colza. The stems are used for thatch, and made into brooms; and their fibres are sometimes woven into very coarse cloth and packing-paper. The seeds are used for emollient poultices. *C. dentata* is similar, but is not cultivated.

GOLD RESERVE. See BANKS AND BANKING — FEDERAL RESERVE SYSTEM.

GOLD STANDARD BILL. See GOLD COINAGE.

GOLD STANDARD AND GOLD PRODUCTION. The metal gold is the only substance of which the earth is composed that is freely accepted in return for all services and in exchange for all other kinds of property by every race in the world. In other words, it is the world's standard of value; the one commodity the market for which cannot be glutted; the one substance that is everywhere accepted not only without compulsion and without limit as to quantity, but that is also the particular object of universal desire. As a mineral it has a history that is probably almost as old as the human race that has fought for its possession with so much avidity. No less than 1,400 years before the dawn of the Christian era, the Greeks were using it as an object of ornamentation, and yet even they were not the originators of the practice. They had borrowed the custom of wearing gold to make the person more attractive from the Egyptians, a people that had decked its women in gold more than 1,000 years before the Greeks had dreamed of utilizing it in this manner. It was, of course, the use of gold as an ornament that first suggested its subsequent use as money, and that finally made it the standard upon which the coinage of the world is based.

Among the many things for which the 19th century will always be memorable not the least important will be the fact that it was during this period that the single gold standard was adopted by practically all the civilized nations of the earth. Beginning with a monetary system that, in a broad sense, may be described as the double standard of silver and gold, the nations of the ancient world maintained this method until sometime in the Middle Ages. From about the beginning of the 7th century, however, and until sometime in the 13th century, the single silver standard of coinage prevailed, and, when the double standard was then reintroduced, it remained in vogue until the 19th century, when the progressive financiers began to appreciate the need of a better system.

England was the nation that led the way in the work of exchanging the double standard of silver and gold for the single gold standard, but, while this was done in 1816, other countries were slow to follow in her footsteps. It was not until 1854, therefore, that the double standard was superseded by the single standard in Portugal, but Germany followed in 1871; the United States, in 1873; the Scandinavian States, in 1874; Holland, in 1875; France and the Latin Union, in 1876; Austria-Hungary, in 1892; British India, in 1893; Japan, in 1898 and Russia, in 1899. The gold standard also prevails in Rumania, Serbia, Turkey and Egypt, but, while all the South and Central American countries, with the exception of Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Salvador and Paraguay have adopted it, most of them are almost hopelessly entangled in a mass of irredeemable paper. It may thus be seen that, among all the nations of importance, China and Mexico alone failed to adopt the single gold standard during the 19th century.

It was not alone for this reason that the 19th century was closely identified with the history of gold, however, for it is this period that will always be noted for having been the occasion of two great events in the world's record; the greatest discovery of gold and the greatest production of gold. According to the statistics prepared by the director of the mint, the world's production of gold during the first half of the 19th century was $787,463,000, while for the second half it was $6,909,040,000. At the beginning of the century the most important gold-producing countries were Mexico, Colombia, Peru, Brazil and Argentina, in the western hemisphere, and Russia and Hungary in the eastern hemisphere. With the exception of small quantities that were obtained in Africa and from the East Indies there was practically no other places where the metal could be found. During the period from 1801 to 1810, the average annual yield of these countries was not in excess of $12,000,000, and fully two-thirds of this amount came from the American mines. Owing to the revolutionary disturbances that broke out in Mexico and throughout South and Central America during the period between 1810 and 1824, the output of gold, as well as that of silver, was greatly reduced. At this time the world's production of gold declined until it reached the comparatively low average of about $7,600,000 per annum, an amount which, in the opinion of William Jacob, one of the best authorities of that period, was insufficient to supply the quantity used in the arts and to make good the loss by accidents, such as by abrasion, shipwreck, etc. As the restoration of peace was quite generally effected about this time, however, disaster was avoided for the increase in the production of gold, which began at once, steadily continued. Even the average output of Russia commenced to show some remarkable gains, her production between 1837 and 1848 averaging more than $12,500,000 per annum, which was in excess of the production of the entire world at the beginning of the century. The following table gives the details of the world's production during the first half of the century as computed by the director of the mint:

PERIOD	Annual average	Total for period
1801–1810	$11,815,000	$118,152,000
1811–1820	7,606,000	76,063,000
1821–1830	9,448,000	94,479,000
1831–1840	13,484,000	134,841,000
1841–1850	36,393,000	363,928,000
Half-century	$15,749,200	$787,463,000

The era of gold discovery dates from 1848, when James Wilson Marshall, on 19 January, discovered a small lump of gold in the tail-race of Sutter's sawmill, in El Dorado County, Cal. Naturally such a discovery led to a search, not only of the bed of the stream but in the adjoining ground, and, in both places, rich deposits of the precious metal were found. The story of the rush that followed this find of new gold fields is a familiar tale to readers of American history. The news spread like wildfire through California, down the Pacific Coast to South America, and finally east to the Atlantic States, and so to Europe. In response to these tidings gold hunters flocked from every inhabitable portion of the globe, with the result that the gold production of California alone amounted to $36,000,000, or a sum equal to that which the annual average of the entire world had attained during the preceding decade. A year later it had reached the sum of $56,000,000, and it was in that year that a similar discovery of placer gold was made in New South Wales, which was followed shortly by a still more important find in the colony of Victoria. New mines were also discovered in Russia during this period, and as all these discoveries were attended by great public excitement and heavy immigration the new mines were so well worked that the production of Australia and New Zealand soon aggregated $65,000,000, while that of Russia alone was in excess of $25,000,000.

The finding of the Comstock lode in Nevada was the next great discovery of the precious metal. This fissure vein, which was fully four miles long, was in rock of the Tertiary Age, and was situated at the base of Mount Davidson, in the Virginia range, an offshoot of the Sierra Nevada. In the central part of the fissure its width is about 3,000 feet, while the gangue, or veinstone, is quartz, not uniformly distributed in the fissure, but coagulated in large bodies commonly known as «bonanzas.» Apparently the metal had been deposited in this place in solution, while some idea of the tremendous magnitude of the deposit may be obtained from the fact that, since 1861, the year when it was first scientifically worked, the Comstock lode has yielded more than $470,000,000 of bullion. At the value ratio of 1 to 16, 40 per cent of the bullion produced was gold, while 60 per cent was silver. As the richest ore bodies of the lode had been exhausted during the seventies, the annual yield gradually declined until, in 1882, it was less than $1,500,000, but as attention was then turned to the working of such lower-grade ores as had previously been neglected, the annual production gradually increased until it had again attained a figure of several millions.

It was about this time (1884) that there was discovered in the Witwatersrand of the Transvaal a deposit of gold that was destined to surpass in magnitude, not the Comstock alone, but every other find of the precious metal that the world had ever seen. Here the country rock is a bed of sandstone, interlaminated with deposits of conglomerate, known to the Dutch as «banket.» It is this conglomerate that carries the gold, the average being 10 pennyweights per ton of material. Borings to the depth of 3,500 feet, however, have found the proportion of gold in this reef undiminished, while the outcroppings of the reef have been traced for a distance of 40 miles. The working of these mines gave the Transvaal a gold production of $78,070,761, in 1898. Then came the interruptions due to the war with Great Britain, in 1899, and this, with other disturbances, made a full resumption of the work impossible prior to about 1904, although it was believed that the output of the Rand would yet equal the sum of $150,000,000. It reached this vast amount in 1908.

The most surprising discovery of modern times, however, was the finding of the gold placers of the Klondike, in 1894. As the ground underneath which this gold is found is perpetually frozen, it is quite evident that these deposits must have been laid down at some age when the climate of that region was much warmer than it is at present. To procure this gold to-day, however, it is necessary to sink a shaft through the frozen ground by the use of hot boulders, after which the drift is run by building a fire against the face of the ground, the gravel which is then thrown out being left until summer, when it will thaw sufficiently to permit of washing and panning. It has been estimated that all the gravel which two men are able to throw out during the eight months of winter can be washed by the same men in two months of the summer. In spite of the difficulties of mining and the cost of transportation the output of the Klondike region steadily increased until 1900, when it was estimated at more than $20,000,000. Since that time there has been a slight falling off in the product, which, in 1904, was figured as somewhat more than $16,000,000. Similar placer mines have also been discovered in the Cape Nome region of Alaska, and, in 1904, their output amounted to more than $9,000,000.

At the present time, however, the most important gold-bearing district within the borders of the United States is that at Cripple Creek, Colo. This ore is a telluride, known to mineralogists as calaverite. The country rock is altered andesite, granite, or phonolite, containing thinly disseminated iron pyrites and tellurium minerals. The tellurium at or near the surface is oxidized and the gold when it is visible exists as an ochre-like powder known as «mustard gold.» The tellurium, through a process of roasting, is oxidized, and the gold thus set free in the metallic state is easily soluble by cyanide or chlorination. The estimated yield of the Cripple Creek district in 1904 was $24,000,000. The increase in the gold production of Australia during recent years has also been a remarkable factor in extending the world's output. During 1900, new workings were established in West Australia, and these, with the product of the older mines, produce an amount of gold, which, in 1904, was approximated at nearly $88,000,000.

The statistics showing the world's production of gold during the 58 years up to 1908 are as follows:

PERIOD	Annual average	Total of period
1851–1855	$132,513,000	$662,566,000
1856–1860	134,083,000	670,415,000
1861–1865	122,989,000	614,944,000
1866–1870	129,614,000	648,071,000
1871–1875	115,577,000	577,883,000
1876–1880	114,586,000	572,391,000
1881–1885	99,116,000	495,582,000
1886–1890	112,895,000	564,474,000
1891–1895	162,947,000	814,736,000
1896–1900	257,596,000	1,287,978,000
1901–1908	....	1,613,098,600
Total	$138,181,000	$8,522,138,600

The production of the world by single years from 1905 to 1908, inclusive, was:

Year	Production
1905	$380,288,700
1906	402,503,000
1907	412,532,900
1908	441,932,200
Total for 4 years	$1,637,256,800

The world's production of gold in 1908, according to the same authority, was divided as follows:

Countries	Value
Australia	$73,327,300
Africa	166,520,500
United States	94,560,000
Russia	28,052,200
Canada	9,842,100
Mexico	22,371,200
India	10,598,500
China	8,647,300
All others	28,013,100
Total	$441,932,200

The production of the United States and its territories during 1909 was divided as follows:

State, etc.	Value
Colorado	$21,954,700
California	21,271,300
Alaska	20,947,600
Nevada	14,908,400
South Dakota	6,849,900
Utah	3,844,800
Montana	3,599,400
Arizona	2,672,300
Idaho	1,389,300
Oregon	712,900
All others	11,081,600
Total	$99,232,200

In concluding this review of the gold situation it may be interesting to note the manner in which new supplies of gold operate on prices. From a commercial point of view, gold stands for purchasing power, and yet people do not mark up the prices of their goods merely because some new gold mine has been discovered, but the fact that some men have two dollars in their pocket where they had only one dollar before creates a greater demand for goods, and it is to this increased demand that the advance in prices is due. It was in this way that the new supplies of gold acted when they brought about an increase in both prices and wages during the 20 years succeeding the discovery of the precious metal in California. This result was not brought about because the community was richer for the privilege of having two dollars instead of one with which to transact a given amount of business, but because, as Professor Cairnes shows, the distributions of the earnings of society was shifted by giving the advantage to wage-earners over rentiers and others having a fixed income. The former had more steady employment and better wages than before, while the latter were compelled to pay higher prices for the goods which they consumed without experiencing a corresponding increase in their income.

GOLD STICK, superior officers in the English Royal Bodyguard, and captains in the Corps of Gentlemen-at-Arms. They take the name from the gilded batons carried by them on state occasions.

GOLDAU, gōl'dow, a valley in Switzerland, in the canton of Schwyz, between Mount Rigi and the Rossberg. On 2 Sept. 1806 a land-slide from Mount Rossberg destroyed the village of Goldau and three other villages situated in the valley, killing about 450 persons. A little village built in the valley, near the mines, is called Goldau. It has a population of about 490.

GOLDCHAIN, or GOLDEN MOSS. See STONE-CROP.

GOLDEN, Colo., city, county-seat of Jefferson County, on Clear Creek, and on the Union Pacific, the Denver & R. G., and the Colorado Southern and other railroads, about 15 miles west of Denver. In the vicinty are deposits of coal and brick clay. The chief industries are smelting, the manufacturing of brick and pottery, tiles and flour milling. A State Industrial School and a School of Mines are located here. The waterworks are owned by the city. Pop. 2,477.

GOLDEN AGE, among the Greeks and Romans was the reign of Saturn, whose blessings are described by Virgil in his eclogue addressed to Pollio. The Latin poet was borrowing from the Greek Hesiod who depicted the Golden Age as the patriarchal era of Saturn or Cronos. This was followed by the Silver Age of voluptuousness under Jupiter. Then came the Brazen or warlike age under Neptune. To this succeeded the Heroic Age under Mars, the Iron or Utilitarian Age under Pluto, god of riches. The Golden Age in England was the reign of Elizabeth (1558–1603); in France under Louis XIV. The Golden Age of German literature included the period between Klopstock and Goethe (1750–1850). The Golden Age of Italian art was the famous 'Cinque Cento' extending from the life of Leonardo da Vinci (d. 1520) to Michelangelo (d. 1576).

GOLDEN ASS, The. The 'Metamorphoses' of Apuleius, or 'The Golden Ass,' as they are popularly called, are the most famous, if not the best, of the Milesian tales — collections of stories which were intended to tickle the fancy with voluptuous pictures by being related in a brief, witty manner. Such tales enjoyed universal favor in antiquity and were probably the prototypes of the Italian «novelle» and the French «fabliaux.» As the opening words of 'The Golden Ass' indicate, the plot was taken from a still extant Greek work, 'Lucius the Ass,' formerly, though probably incorrectly, attributed to Lucian, a contemporary. Apuleius, however, was no mere slavish translator. He improved the plot of the original by shortening several scenes and cleverly paraphrasing others, by embellishing it with other excellent stories of love, sorcery, jests and robbers, and in particular by inserting the long and beautiful allegory of Cupid and Psyche (bk. IV, sect. 28, to bk. VI, sect. 24), which has been described as «an antique gem in an unworthy setting.» Probably many of these stories were not original, but belonged to the common stock of Greek and Latin literature. There were quite a few collections of these «facetiæ,» the most famous of which was called 'Milesian Tales,' originally collected by one Aristides and translated into Latin in late republican times by the historian Sisenna. Probably some of these survived in the earlier novel of Petronius. Although most of the tales are of more than doubtful morality, Apuleius tells them in such a rollicking fashion that the spirit of fun predominates, just as in Boccaccio's 'Decameron,' which contain at least two of Apuleius' stories in Italian surroundings. The hero of 'The Golden Ass,' one Lucius, traveled into Thessaly where, after a sojourn of a few days, he was transformed into an ass through his excessive curiosity to learn magic. Nothing could restore him to his own shape but the eating of a rose, which he at length obtained by prayer after many trials and adventures. The book ends with a fine description of the mysteries of Isis, into which the hero is initiated and through which he becomes purified. The theme of the work has been explained as somewhat allegorical: that men overcome by lusts of flesh become practically beasts and are not restored to their pristine selves except by tasting the rose of reason and virtue to be obtained by prayer. Apuleius has been criticized for his rare and outlandish words, his coinages and jingling assonances, his græcisms and solecisms, but it must be admitted that the style which he has adopted is admirably suited to the character of the work. An eclectic critical text by S. Gaselee and a reprint of William Adlington's (1566) translation with improvements appear in the Loeb Classical Library (1915).

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GOLDEN BEETLE, one of the richly gilded beetles of the family *Chrysomelidæ* (q.v.).

GOLDEN BIBLE, the Book of Mormon, which Joseph Smith, Jr., professed to have found in 1823. He declared that an angel appeared to him and led him to the discovery. He was not, however, allowed to take up the gold plates on which the book was written until four years later. Joseph Smith was at first unable to read the «reformed Egyptian» characters in which the revelation was written until, in the same box with the plates, he discovered an instrument called Urim and Thummin, by the aid of which he translated the Golden Bible into English and published it in 1830, with the certificate of 11 men testifying that they had seen the plates of gold. See BOOK OF MORMON.

GOLDEN BOOK (LIBRO D'ORO), official record of the notables of Venice under the Republic. The roll was inscribed in letters of gold, and the term was afterward used to designate any list of honors. The Golden Book of Venice was destroyed by Napoleon in 1797.

GOLDEN BULL, a name given to several state documents; the principal ones are as follows:

1. Of Hungary, 1222, wrung from King Andrew II by his nobles, just as Magna Charta was extorted from John of England. Andrew II of Hungary, surnamed «Hierosolymitanus,» was a feeble, self-willed, worthless king, like John of England. Its terms were:

The nobles and the Church were to be exempt from taxes.

The daughter of a noble without male heir shall inherit one-fourth of his property,

No noble shall be obliged to follow the king in any foreign war.

The palatine (that is, mayor of the palace), shall be the supreme judge.

No foreigner to hold office or dignity without consent of the council of the realm.

The king shall not grant counties or offices of any kind in perpetuity.

If the king violates any of the laws in this bull, it shall not be treason to levy war on him.

This bull was so called because the attached seal was enclosed in a golden case or box. It is rather remarkable that one of the very first countries in Europe to effect the liberty of subjects should have been one of the last-born nations, the Huns of Hungary.

2. 'Bulla Aurea of the Empire,' 1356, published by Kaiser Karl IV at the Diet of Nuremberg, and held the Magna Charta of Germany. It prevented a repetition of the contests which had hitherto arisen whenever a vacancy in the throne occurred; and regulated the functions, number and privileges of the electors. Called «golden» because the seal attached to the parchment was of gold instead of lead, or else that it was enclosed in a golden case.

It limited the number of electors to seven (three prelates and four lay princes). The prelates were the three archbishops of Maine, Cologne and Treves; the lay princes were the king of Bohemia, the Duke of Saxon, the Margraf of Brandenburg, and the Pfaizgraf of the Rhine. Their persons were declared sacred. Every question was to be decided by majority and without appeal.

GOLDEN CALF, an idolatrous image, doubtless of Egyptian suggestion and symbolism, cast by Aaron from the earrings of the people, while the Israelites were encamped at the foot of Sinai and Moses was absent on the Mount.

GOLDEN CIRCLE, Knights of the. See KNIGHTS OF THE GOLDEN CIRCLE.

GOLDEN CROSS, United Order of the. See UNITED ORDER OF THE GOLDEN CROSS.

GOLDEN-CROWNED SPARROW, THRUSH, etc., birds so named for some conspicuous yellow marking on the top of the head. The sparrow (*Zonotrichia coronata*) is a near relative of the white-crowned, or Peabody bird (q.v.), and is seen in the United States only in the spring and fall; it sings brilliantly in its Arctic and Alaskan breeding-home. The golden-crowned «thrush» is a warbler, better known as «oven bird» (q.v.). The «wren» or «gold-crest» is a kinglet (q.v.).

GOLDEN or WAR EAGLE. See EAGLE.

GOLDEN EAGLE, ORIOLE, PLOVER, SHINER, WARBLER. See EAGLE; ORIOLE; PLOVER, etc.

GOLDEN CHAIN, or GOLDEN RAIN, tree of the laburnum family. See LABURNUM.

GOLDEN-EYE, WHISTLE-WING or RATTLEWING, a duck (*Clangula clangula*) which breeds numerously in all northern regions where its nest is made in holes in trees, or (in Lapland) in suitable boxes placed in trees. The American birds form a geographical race called *Americana*. During cold weather they appear in the United States and the middle districts of Europe, traveling about in small, watchful parties which escape swiftly on the least alarm, and arouse all other ducks within sound of the loud noise made by their wings. An European name is «garrot.» The general color of the drake is white beneath, with head and sides of neck rich green, back and tail grayish-black and the bill bluish-black; it has a round white spot before each eye, the iris of which is golden yellow, and two white bands on the wing; length about 19 inches. The female is ashy, with rufous head. In the Rocky Mountains and northward occurs a second somewhat larger species, Barrow's golden-eye (*C. islandica*), which differs prominently in the greater extent of the loral spot.

GOLDEN FLEECE. See ARGONAUTS.

GOLDEN FLEECE, Capture of the ('Argonautica'), an epic poem in four cantos, by Apollonius of Rhodes (235 B.C.), a contemporary of Ptolemy Philadelphus. Apollonius found all the elements of his poem in the legendary traditions of the Greeks; the expedition of the Argonauts being, next to the siege of Troy, the most famous event of the heroic ages. The third canto describes the conquest of the Golden Fleece, and the beginning of Medea's love for Jason, the development of which forms the finest portion of the poem. The Argonauts go through the most surprising adventures, and encounter perils of every description, before they are able to reach the port from which they started. These various events have allowed the poet to introduce brilliant mythological pictures, such as his account of the Garden of the Hesperides. The work has been frequently translated, and is admittedly the masterpiece of Alexandrian literature. The 'Argonautica' of Valerius Flaccus is an imitation of that of Apollonius, regarded by most modern scholars as without originality or invention.

GOLDEN FLEECE, Order of, a celebrated order of knighthood in Austria and Spain, founded by Philip the Good, Duke of Burgundy and the Netherlands, at Bruges, 10 Jan. 1429, on the occasion of his marriage with Isabella, daughter of King John I of Portugal. The order was instituted for the glory of the saints and the protection of the Church, and the fleece was probably assumed for its emblem as much from being the material of the staple manufacture of the Low Countries as from its connection with heroic times. The number of the knights was 31, and they themselves filled up vacancies by vote. This continued till 1559, when Philip II of Spain held the last (the 23d) chapter of the order in the cathedral of Ghent; and subsequently Philip obtained from Gregory XIII permission to nominate the knights himself. After the death of the last Hapsburg king of Spain in 1700, the Emperor Charles VI laid claim to the sole headship of the order in virtue of his possession of the Netherlands, and, taking with him the archives of the order, celebrated its inauguration with great magnificence at Vienna in 1713. Philip V of Spain contested the claim of Charles; and the dispute, several times renewed, was at last tacitly adjusted by the introduction of the order in both countries. The insignia are a golden fleece (a sheepskin with the head and feet attached) hanging from a gold and blue enameled flintstone emitting flames, and borne in its turn by a ray of fire. On the enameled obverse is inscribed *Pretium laborum non vile.* The decoration was originally suspended from a chain of alternate flints and rays, for which Charles

V allowed a red ribbon to be substituted, and the chain is now worn only by the grand-master. The Spanish decoration differs slightly from the Austrian. The costume consists of a long robe of deep red velvet, lined with white taffetas, and a long mantle of purple velvet lined with white satin, and richly trimmed with embroidery containing fire-stones and steels emitting flames and sparks. On the hem, which is of white satin, is embroidered in gold, *Je l'ay empris* («I have captured it»). There is also a cap of purple velvet embroidered in gold, with a hood, and the shoes and stockings are red. Consult Reiffenberg, ‹Histoire de l'Ordre de Toison d'Or› (1830); and Zoller, ‹Der Orden vom Goldenen Vlies› (1879).

GOLDEN GATE, a channel at the entrance to San Francisco Bay, between the peninsula upon which is located San Francisco and the one upon which Sausalito stands. The average width is two miles, and the depth is sufficient for ocean steamers. It is guarded by Forts Pointe and Mason, both on the south shore, and by a fort on Alcatraz Island. The name was given to this channel by Drake, about 1578.

GOLDEN HIND, The, one of the two vessels in Sir Humphrey Gilbert's colonizing expedition of 1583. Gilbert's own vessel was the *Squirrel,* and he went down with it in a storm. The *Golden Hind,* Capt. Edward Hales, returned to England with the news.

GOLDEN HORDE, body of Tatars who overran eastern Europe in the middle of the 13th century and founded in Russia the Empire of the Golden Horde, or, Western Kipchaks. Their leader was Bātū-Khan, son of Jūjī Khan and grandson of Jenghiz Khan, and the invasion, which began about 1237, was characterized by merciless slaughter and destruction. The Golden Horde conquered and burned everything in their path through Russia and into Silesia, Poland and Hungary. At Liegnitz they defeated Henry II, Duke of Silesia, on 9 April 1241, but the cost of this victory was so heavy that Bātū-Khan found himself unable to conquer Neustadt, and turning back upon his path established himself on the Volga, his gorgeous tent giving rise to the name of the empire and its followers, the Golden Horde. Here he summoned the Russian princes to render fealty, and rapidly established a power which remained unbroken in the hands of his direct descendants until 1359, when the empire was ruled under various heads of the old house of Jūjī, none of them governing the entire empire. In 1378, however, Toktāmish of the Eastern Kipchaks established himself as emperor of both Eastern and Western Kipchaks, and for a time maintained something of the old glory of the Golden Horde, but was finally overcome by Timur in 1395. Consult Howorth, Sir H., ‹History of the Mongols› (1876–85); Lane-Poole, S., ‹Mohammedan Dynasties› (1894).

GOLDEN HORN, the harbor of Constantinople, an inlet of the Bosporus; so called from its shape and beauty. See CONSTANTINOPLE.

GOLDEN HOUSE OF NERO, a palace which Nero erected for himself at Rome after the disastrous fire of 64 A.D. This palace stretched from the Palatine across the level area on which the Flavian amphitheatre was afterward built to the foot of the Esquiline. According to Tacitus, whose virulence is often unjust, Italy and the provinces were plundered to gratify the emperor's love of magnificence in the erection of this structure. Gold and precious stones blazed on its walls; the grounds around it were variegated with meadows, lakes and shady woods, and it was considered one of the wonders of the Roman Empire.

GOLDEN HUMMER (BLACK-EARED FAIRY), Peruvian humming bird (*Heliothrix aurita*). It has a sheen of gold over its plumage which is green and heliotrope above and white below, with golden shading at the throat.

GOLDEN LEGEND, collection of legendary lives of saints, written by Jacobus de Voragine, archbishop of Genoa. The work was entitled ‹Legenda Sanctorum› by the author but was popularly christened ‹Legenda Aurea› or ‹Golden Legend› because of its estimated worth. It was called ‹Lombardica Historia› in some early editions, due to the fact that a short history of the Lombards down to 1250 is added to the life of Pope Pelagius which forms next to the last chapter in the book. The work contains 177 chapters, or, by some estimates, 183, and is divided into five parts, from Advent to Christmas, to Septuagesima, to Easter, to the Octave of Pentecost, to Advent, and gives the lives of the saints in the order of their festivals. The book was written with devotional rather than historical purpose and was not only widely popular in its day but exercised considerable influence on the religious prose and poetry of later times. In 1500 it had run through 74 editions in Latin, besides three translations into English, five French, eight Italian, 14 Low German and three Bohemian. The first English edition was printed by William Caxton for the Earl of Arundel (1483), which edition was revised by Ellis (New York and London 1900). The best Latin edition is that of Grasse (Dresden and Leipzig 1846, 1850; Breslau 1890); the first French edition was that of Jean Batallier (Lyons 1476), and recent French editions are those of Brunil (1843, 1908) and Roze (1902). The author, James of Viraggio, or Jacobus, or Jacopo de Voragine, was born at Viraggio (now Varazze), near Genoa about 1230 and died 13 July 1298. He entered the Order of Saint Dominic, was provincial of Lombardy in 1267–86 and held other high offices in the Church until 1292, when he became archbishop of Genoa.

GOLDEN LEGEND, The, lyric drama by Longfellow, one of the trilogy entitled ‹Christus,› published in 1851. It has a mediæval setting and is of a religious character. While some critics find in it a suggestion of ‹Faust,› others ascribe its title and conception as coming from the ‹Golden Legend› of Jacobus de Voragine. It is also thought to be based on Hartman von Aue's ‹Der Arme Heinrich.›

GOLDEN MOLE, or **CAPE MOLE,** a South African insectivore with fur showing golden iridescence. It has the habits of a mole, no external ears or tail and the eyes covered with skin; but a greater structural resemblance to the potamogales (q.v.). Five species constitute the family *Chrysochloridæ*, differing from moles (q.v.) most markedly in the fact that the forefeet are adapted for digging by the development of the middle toe into a powerful tool, and by a hollowing inward of the chest. The best-known species is *Chrysochloris trevelyani*, about six inches long.

GOLDEN NUMBERS, Cycle of, Metonic lunar cycle, a period of 19 solar months, or 235 lunations, after which time the new moon falls again on the same days as in the preceding cycle. The discovery was made by Meton, the Athenian astronomer, 423 B.C., who divided the calendar into periods of 19 years, numbering from 1 to 19, in which the new moons would come on the same days in the years designated by the same numbers. The Athenians welcomed the system and it was ordered that the years of the Metonic cycle should be written in gold on marble pillars in the temple, hence the name, Golden Numbers. The 19 years of the Metonic cycle were purely lunar, which obviously made it impossible that all the years should be of the same length, a difficulty overcome by assigning to 12 of the 19 years 12 lunations, while the remaining seven had 13. The 13th lunation was designated as the embolismic or intercalary month. The Metonic reckoning by the Gregorian calendar is from 1 B.C., as by the Metonic system the new moon beginning the cycle fell on 1 January every 19th year. As in the Julian calendar the months had no reference to the moon, the early Christians used the Metonic lunar cycle to fix the date for Easter. The cycle was used as originally devised by Meton until 1582, when it was revised and incorporated as a part of the Gregorian calendar.

GOLDEN ORIOLE, commonly known as the Baltimore oriole, an American bird (*Icterus galbula*), closely allied tó the *Ploceidæ*, weaving birds of Asia. Its nest is skilfully constructed so as to hang in the form of a long slender pouch from the extremity of a bough. Its plumage is brilliantly contrasted in color, and as black and yellow were the armorial colors of Lord Baltimore it was named in early colonial days after that nobleman. It is found in the hot months as far north as the coast of New Brunswick, and westward from the Saskatchewan River to Texas and northern Louisiana. In winter it migrates to Panama and the West Indian Islands. It is a powerful and delightful songster. Its eggs are from four to six in number and hatch in 14 days. The golden oriole is the farmer's friend and destroys many insect pests which are destructive to vegetation.

GOLDEN ROSE, a rose of gold, or gilded, blessed by the Pope on the fourth Sunday of Lent and sent to some sovereign or other person who is known for his or her loyalty to the Holy See. It is sometimes sent to noted churches or sanctuaries.

GOLDEN RULE, the rule laid down by Jesus in the Sermon on the Mount and stated by him to be the law and the prophets — that is, a summary of their teaching: «Therefore all things whatsoever ye would that men should do to you, do ye even so to them» (Matt. vii, 12). This rule had already been «examined and adopted as a standard of ethics by westerns like Socrates and easterns like Thengtsen, the disciple and friend of Confucius, some centuries before the birth of Christ.»

GOLDEN SEAL, Order of the, fraternal organization incorporated in New York State in 1902. Membership includes life insurance, as well as covering losses through accident and illness. It is organized with a mutual sharing of profits clause, dividends being declared every six years. It is governed from a supreme court and distributes about $1,000,000 in benefits annually. Membership (1918) 10,000.

GOLDEN SEAL, ORANGE-ROOT, YELLOW PUCCOON, or YELLOW INDIAN PAINT, a ranunculaceous perennial plant (*Hydrastis canadensis*) of wooded regions throughout the eastern United States, which sends up in early spring a hairy stem about a foot high, with large, deeply-lobed leaves and a single greenish-white flower, followed by a head of crimson berries which resemble a raspberry. The root-stock is gathered by country people, especially in the South, for the sake of its thick orange-yellow bark from which a drastic and tonic medicine is made.

GOLDEN SECTION (Sectio aurea), division of a line in extreme and mean ratio, solved by Euclid II, and originally known as «divine proportion.» The Pythagoreans used it in the construction of the regular pentagon, and Eudoxus perfected various theorems relating to it. Fra Luca Pacioli treated the subject at some length in 'Divina Proportione' (Venice 1509; German translation, Vienna 1889); and his ideas were embodied in Zeising's 'Neue Lehre von den Proportionen des menschlichen Körpers' (Leipzig 1854) and 'Der goldene Schnitt' (1884). Consult Bochenek, 'Kanon aller menschlichen Gesstalten und der Viere' (1885); Pfeifer, 'Der goldene Schnitt' (1885); Matthias, 'Die Regel von goldenen Schnitt im Kunstgewerbe' (1886).

GOLDEN SPUR, Order of the, a papal order of knighthood, whose foundation has a legendary origin in Constantine the Great, or Pope Sylvester. Its institution can be traced historically to Pope Paul IV, 1559. The title of the members is «Count Hospitalers of the Lateran.» The right of bestowing the order is vested in other prelates and kings beside the Pope. When it languished, Gregory XVI revived it in 1841. It is intended to be bestowed as a recognition of conspicuous merit in personal character, science and art, and for services done to humanity and the Holy See. The badge is a gold Maltese cross with white enameled surface, to which a pendant spur is attached. On one face of the cross is a bust of Sylvester, with the inscription, *Sanctus Silvester Pont. Max.* (Saint Sylvester, Pope). On the reverse is engraved «MDCCCXLI Gregorious XVI. restitut» (Gregory XVI restored it in 1841). The order has three grades; the ribbon is red with black stripes.

GOLDEN STATE, California, so named on account of its gold deposits.

GOLDEN TREASURY, The, a collection of English poetry published in 1861. The book was dedicated to Tennyson, with whom Palgrave had long discussed his plan. In the course of 30 years the original form was enlarged to include other poems of importance and rearranged to conform more to literary history, the latter change in some judgments advantageous, in others not. The collection begins with the Elizabethans, and, with some rather conspicuous omissions, the old English ballads or some of Shelley, for example, and the relative exaggeration of the amount of Wordsworth included, follows the great names up through Keats, Shelley and Byron. The great success of the book can scarcely be said to have diminished to this day. The 'Second Series,' composed of contemporary verse, appeared in 1897, but was comparatively a failure. Palgrave's age and the uncertainties of contemporary judgment, perhaps, afford the explanation. Anthologies, collections of the flowers of poetry, are of ancient origin; but few — none in English certainly — have rivalled 'The Golden Treasury.' Palgrave's original poetry never attained to great eminence, but the quality that he gave to his anthology amounts to a unique and original distinction. It is as if a finely endowed artistic nature had worked, though unable to create through the brush itself, to bring together a collection of pictures that expressed a veritable artistic creation. The author — a word that applies thus to no other anthology-maker in English — of 'The Golden Treasury' expresses himself through taste and judgment in poems as another author might in subject matter and style. And not the least of the causes to his complete effect lies in the subtle and exquisite arrangement by which poems follow one after another, leading out the thought of one to enrich the other, and often to build up a mood to which each poem is made to contribute and by which it is revealed. The combination of the last five poems in the book, for example, is itself a poem; and the idea of ending the whole with Shelley's «Music when soft voices die» is an act of creative imagination.

STARK YOUNG.

GOLDEN VERSES, collection of maxims credited to the Pythagoreans, containing in brief sententious form the teachings of everyday virtue.

GOLDEN WARBLER, American wood warbler (*Dendroica æstiva*), also called yellow bird, summer warbler and yellow warbler. Their predominating color is a yellowish olive-green, the female being slightly darker than the male. They are common to North America in general, migrating southward to Central America and the upper portion of South America. They are closely allied to the golden-winged warblers (*Vermivora chrysophtera*), one of the swamp warblers with similar migratory habits.

GOLDEN WASP, or GOLD WASP, a cuckoo-fly (q.v.).

GOLDEN WEDDING. See DIAMOND WEDDING.

GOLDEN-WINGED WOODPECKER. See WOODPECKER.

GOLDENROD (*Solidago*), a genus of plants belonging to the family *Asteraceæ*, containing about 125 species, most of them natives of North America, where their brilliant yellow flowers are very conspicuous in the autumnal months, especially in Canada and the northeastern United States. Two or three species are found in Europe, and a few in South America and Mexico. They are perennial, herbaceous, with simple undivided leaves and bear numerous small heads of flowers, disposed in spikes or panicles. Among the marked forms of inflorescence are the pyramidal panicle of numerous, one-sided, scorpioid racemes, well illustrated by *S. canadensis* and *S. rugosa;* the almost level cyme of *S. rigida;* and the dense thyrsus-like cluster of *S. speciosa.* The florets of the ray are about five in number, and yellow, *S. bicolor* excepted, which has whitish rays. The dried leaves of the sweet-scented or anise-scented goldenrod (*S. odora*) have been used as a substitute for tea. This plant yields an aromatic oil with tonic properties. In Europe the different species are cultivated in gardens for ornament; one, the Aaron's rod (*S. virgaurea*), is common in Great Britain. The alpine goldenrod is found on the summits of mountains in Maine, New Hampshire and northern New York. The sea-side or salt-marsh goldenrod (*S. sempervirens*) is an especially showy species; and the «yellow-weed» (*S. canadensis*) sometimes attains a height of eight feet.

GOLER, George W., American physician: b. Brooklyn, 24 Aug. 1864. He took his M.D. at the University of Buffalo in 1889. He was connected with the Infants' Hospital, Charlotte, N. Y., in 1888–97; medical inspector of the Rochester Board of Health in 1892–96; and since 1896 he has been health officer of Rochester. He established in 1897 a series of municipal milk depots which have been recognized as models and adopted by health authorities in Europe and America. He established the Rochester Hospital for Infectious Diseases in 1904, and since its opening has acted as attending physician. He has been active in the crusade against tuberculosis; was honorary president of the 4th section of the International Congress for Child Hygiene at Berlin 1911; and is a member of the advisory committee of the National Consumers' League. He is author of a number of articles on hygiene and sanitary science.

GOLDFINCH. (1) The familiar North American black-winged «yellowbirds» or «wild canaries» of the genus *Spinus*, the best known of which is the Eastern thistle-bird or lettuce-bird (*S. tristis*), whose wave-like flight across the fields, each male singing sweetly in its course, forms one of the most pleasing incidents of a rural stroll. These little finches are bright golden-yellow, with the cap, wings and tail black in the adult male; while the female and immature young are gray-brown and yellowish; and in autumn the male discards his conspicuous dress and assumes the plain attire of his mate. At this season they collect in flocks and remain together during the winter, seeking the seeds of the meadow-grasses and roadside weeds, especially thistles, and often coming near the house and barn. Their summer food includes more soft material, and they gather many caterpillars for their young. The goldfinch is one of the latest birds to make its nest, delaying until midsummer to fabricate the soft cup of hempen and downy materials which is lodged usually in some crotch of a village shade-tree, and contains half a dozen spotless bluish eggs. Several other species dwell in the western United States and southward. (2) The small European finch (*Carduelis carduelis*) to which the name first belonged, and whose habits are much the same as those above described, but which is more varied in plumage. The bill is horn-color, the tip black and the base encircled with crimson; nape of neck white; top of head, shoulder of wing and a part of the quills, black; remainder of wing dull yellow; back and rump dusky brown; under surface dull white. Its nest is neatly built of moss, twigs, roots, etc., lined with wool, is situated in bushes, hedges or apple-trees, and the eggs are spotted with purple and brown. This finch is one of the sweetest singers of Europe, a favorite cage-bird and the one most often taught pretty tricks; it is the most useful decoy in bird-catching. Examples are to be found in bird-stores all over the world; and in the neighborhood of New York many have escaped and are living wild in the parks and environs.

GOLDFISH, a carp (*Carassius auratus*), highly cultivated long ago in China as a domestic fish for the sake of its rich red-gold color, developed out of an originally much duller hue. It was introduced into England in 1728 and has spread over all of Europe and is naturalized in many waters of the United States as well as everywhere kept in household aquaria. The young are dark-colored, assuming the golden hue later in life, and sometimes losing it in old age, when the fish becomes silvery. The «silver fish» is a mere variety, as are the so-called «telescope fish» with large protruding eyes and the Japanese «butterfly fish,» in which anal and caudal fins become more or less markedly double. All of these varieties thrive well in confinement when furnished with favorable conditions in the aquarium (q.v.), but are liable to fungus diseases of the skin. Diseased fish will infect all in an aquarium, and the aquarium itself, so that in the case of an inexpensive glass globe it is better to throw the receptacle away; a large aquarium should be emptied and thoroughly treated with some fungicide (q.v.) before new and healthy fish are installed. These fish are bred for sale by some fish culturists in various parts of the United States, who must exercise care or their stock will revert toward the original unadorned type of the species.

GOLDIE, Sir George Dashwood Vaubman, British administrator: b. The Nunnery, Isle of Man, 20 May 1846. He was educated at the Royal Military Academy, Woolwich, and entered the Royal Engineers with rank of lieutenant, remaining there for two years. He then engaged in traveling and exploring in Africa and in 1877 reached the Niger country. Realizing the possibilities of development in the country of the lower and middle Niger he set about adding those regions to the British Empire. He chose the Dutch East India Company for his model, secured the consolidation of British commercial interests in the Niger under the title United African Interests in 1879, and in 1881 appealed to the government for a charter. For five years Goldie fought opposition of various sorts and met them with achievements that overruled them. The name of the company was changed to the National African Company, its capital increased from $625,000 to $5,000,000, and numerous new stations were established on the Niger. Treaties, drawn by Goldie, were made with some 400 lower Niger and Hausa states, French territorial rights were bought in 1884 and at the Berlin Conference in 1885 he was able to establish the fact that the lower Niger territory was wholly under the British flag. The Niger coast line was also placed under British protection. In July 1886, Goldie's efforts were rewarded by the granting of the desired government charter, the company then becoming the Royal Niger Company. Lord Aberdare was appointed governor and Goldie vice-governor, and in 1895 he became governor. In 1900 the Royal Niger Company ceded its territories to the British government in consideration of a payment of $4,325,000, it having become impracticable for a chartered company longer to maintain its rights against the state-protected interests of France and Germany. Goldie was knighted in 1887 and received honorary degrees from Oxford and Cambridge. He served as a member of the Royal Commission on the South African War in 1902–03, and on that of the War Stores in 1905–06. He is a member of the Royal Society, was president of the Royal Geographical Society in 1905, became a privy councillor in 1898 and is president of the National Defense Association.

GOLDING, Arthur, English writer and translator: b. probably at London about,1536; d. about, 1605. He finished the translation of Philippe de Mornay's treatise 'Sur la Vérité du Christianisme' which was begun by Sir Philip Sidney and entrusted to his care, publishing it under the title 'A Woorke Concerning the Trewenesse of the Christian Religion, etc.' (1589). Beside making translations of the works of Calvin and Beza, he also translated the first four books of Ovid's 'Metamorphoses' (1567).

GOLDMAN, Emma, Russian agitator and anarchist: b. Kovno Province, Russia, 1869. She emigrated to the United States in 1886 and joined the anarchists in their protests at the executions following the Haymarket Square riot in Chicago soon after her arrival. She gained great notoriety by her speeches in German and Yiddish, denouncing established order. In 1893 she was sentenced to a year's imprisonment at Blackwell's Island, New York city, for speeches and actions inciting to riot. She lectured extensively in England, Scotland and the United States, and after 1906 was connected with *Mother Earth,* an anarchist organ. She was a delegate to the Anarchist congress in Paris, 1899, and at Amsterdam in 1907. In 1917 she was tried for conspiracy against the Draft Law and on 10 July 1917 was sentenced to two years' imprisonment and fined $10,000. An appeal was granted by Justice Brandeis of the United States Supreme Court on 20 July and she was released on bond. The United States Supreme Court affirmed the sentence 15 Jan. 1918 and on 12 Feb. 1918 she began her sentence at the Federal prison, Jefferson City, Mo. Under the alien law existing at the time, an alien twice convicted of a crime may be deported; so that conviction carried with it a sentence of deportation. She wrote 'Anarchism and Other Essays' (1910); 'The Social Significance of the Modern Drama' (1914), etc.

GOLDMARK, Karl, Austrian composer: b. Keszthely, Hungary, 18 May 1830; d. 1915. He studied at the Vienna Conservatory. His first composition of note was the overture, 'Sakuntala' (1858); his first opera the 'Queen of Sheba' given at Vienna in 1875. His other works include 'Merlin,' an opera performed for the first time at the Metropolitan Opera House, New York, in 1887; the overtures 'Prometheus,' 'In Spring' and 'Penthesilea'; and the symphony 'The Country Wedding.'

GOLDMARK, Reuben, American composer: b. New York, 15 Aug. 1872. He was educated at the College of the City of New York and at the Vienna Conservatory of Music. He was a pupil of Door and Rafael Joseffy on the piano and of Fuchs and Antonin Dvorak in composition. He was instructor in piano and theory at the National Conservatory of Music, New York, in 1891–93 and director of the Colorado Conservatory of Music in 1895–1901. He returned to New York in 1902, has given extended courses of lecture recitals in United States and Canada and produced a number of compositions. In 1910 he received the Paderewski prize for chamber music. Among other compositions are a symphonic poem, 'Samson,' and the overture to 'Hiawatha,' played by the Boston Symphony Orchestra.

GOLDONI, gŏl-dō'nē, **Carlo,** the founder of modern Italian comedy of comedies: b. Venice, 1707; d. Paris, 6 Feb. 1793. He early showed a taste for theatrical representations, reading every dramatic production of which he could obtain possession, especially the works of the popular comic poet, Cicognini, and when scarcely eight sketched a comedy, which excited the wonder of his relatives. His father, a physician then practising at Chiozza, destined him for the medical profession, and took him occasionally to visit his patients. But Goldoni, dissatisfied with this study, obtained permission to study law in Venice. Soon after, however, a relative procured for him a place in the Papal College at the University of Pavia, from which he was expelled for writing an abusive satire. His father died in 1731, and from this time Goldoni lived an unsettled and wandering life, resorting to various means to make a livelihood, but usually living as the companion of strolling players in a continual scene of dissipation and intrigue until 1736, when he married and removed to Venice.

Goldoni's merits in reforming the Italian theatre cannot be mistaken. He was a most prolific writer, and in one year produced an output of 16 comedies. Many of his numerous pieces still retain possession of the stage in his native country, and, in translations, of the stages of foreign countries. Among the numerous editions of his works, that published at Venice in 1788 and 1794–95, in 44 volumes, is the most complete; and that published at Florence in 53 volumes in 1827 the most elegant. Translations and imitations of some of his works have been made in French, German and English. Goldoni wrote memoirs of himself in French, in which he also composed two comedies, one of which, 'Le Bourru bienfaisant,' was produced at Fontainebleau and Paris in 1771 with great applause, and has maintained itself on the stage. (See MÉMOIRES DE CARLO GOLDONI; UN CURIOSO ACCIDENTE). Consult Memoirs of Carlo Goldoni,' translated by Black, with essay by W. D. Howells (1877); Rabany, 'Le Théatre et la Vie en Italie au XVIIIème siècle' (1896); Copping, 'Alfieri and Goldoni'; Chatfield-Taylor, 'Goldoni: a Biography' (1913).

GOLDSBORO, N. C., city, county-seat of Wayne County, on the Neuse River, the Atlantic and Norfolk Southern, the Southern and the Atlantic Coast Line railroads, about 80 miles north of Wilmington and 50 miles southeast of Raleigh. It is the site of a State Normal School for colored teachers, the Eastern Insane Asylum, and the Odd Fellows' Orphanage. The chief manufactures are cotton, agricultural implements, cotton-seed oil, furniture, mattresses, veneer, bricks, knitting and machinery. It was settled in 1838 and was incorporated in 1841. The government is administered by a mayor, elected biennially, and a council. The waterworks are municipally owned. Pop. 10,500.

GOLDSBORO, KINSTON, and GOLDSBORO BRIDGE, Engagements at. On 11 Dec. 1862, General Foster, in command of the Department of North Carolina, set out from Newbern for the purpose of taking Goldsboro and breaking the railroad that connected Richmond with the railway system of the South and Southwest, and then forming a junction with the Union forces at Suffolk and Norfolk, Va. He had four brigades of infantry, a regiment of cavalry and seven batteries and two sections of batteries, in all about 11,500 men and 40 guns. He reached Southwest Creek on the 13th, to find the bridge destroyed and his passage disputed by about 400 Confederates, with three guns. The 9th New Jersey and 85th Pennsylvania soon routed this force, capturing one gun, and Foster pushed on toward Kinston, skirmishing heavily on the way, and when within a mile of the place, 14 December, encountered a force of 2,000 men under General Evans, posted between the Neuse River and a deep swamp. After a sharp fight Evans was driven across the river, firing the bridge behind him; but the fire was extinguished and 400 prisoners and six guns were taken. Evans retreated through Kinston, reformed his command two miles beyond and withdrew toward Goldsboro. Foster followed, had a successful engagement on the 16th, at White Hall and, when nearing Goldsboro 17 December, was checked by a heavy force under Gen. G. W. Smith at Goldsboro Bridge. Foster succeeded, however, in destroying the bridge of the Weldon and Wilmington Railroad over the Neuse, also several other bridges, and about six miles of railway, and retreated somewhat rapidly to Newbern, having lost, during his eight days' campaign, 92 killed, 487 wounded and 12 missing. The Confederate loss was 71 killed, 268 wounded, and 496 prisoners. The latter were paroled.

After the capture of Wilmington by General Scofield, 22 Feb. 1865, his next objective point and final destination was Goldsboro, where it had been arranged that he should unite forces with General Sherman, who was marching north from Savannah. Forces were assembled at Newbern, and the march began on 1 March. Kinston was occupied 14 March, after some days' sharp fighting. The railway and bridges were repaired, and Scofield entered Goldsboro with little opposition on the 21st, and two days later Sherman joined him. Consult Official Records, Vol. XVIII; Cox, 'The March to the Sea'.

GOLDSBOROUGH, Louis Malesherbes, American naval officer: b. Washington, D. C., 18 Feb. 1805; d. there, 20 Feb. 1887. In 1827 he rescued the English brig *Comet* from a Greek pirate. Retiring from the navy in 1833 he settled in Florida, and there he recruited a company of cavalry which fought under his command in the Seminole War on the conclusion of which he returned to the navy; became commander in 1841; was officer of the frigate *Ohio* during the Mexican War and was present at the bombardment of Vera Cruz. On his return to the United States he was appointed a member of the Joint Army and Navy Commission in California and Oregon (1849). He was superintendent of the United States Naval Academy at Annapolis (1853–57), on retiring from which he again took up active military duties. On the outbreak of the Civil War he became flag officer and rear-admiral (1862). In 1861 he was put in command of the North Atlantic blockading squadron and the advice given by him at this time resulted in the Burnside expedition and the capture of Roanoke Island with various other positions of strategic importance in North Carolina. He was in command of the European squadron (1865–67); commandant of the navy yards at Mare Island and at Washington (1867–73).

GOLDSCHMIDT, Jenny Lind. See Lind, Jenny.

GOLDSCHMIDT, gōld'shmit, **Meier Aaron,** Danish novelist and publicist: b. Vordingborg, 26 Oct. 1819; d. Copenhagen, 15 Aug. 1887. He entered journalism when quite young, edited the comic paper *Corsaren* (1840–46), and in 1847 founded a monthly publication in which he discussed the political movement of the time, and showed himself a strong advocate of constitutional freedom. His first novel, 'A Jew,' appeared in 1845; other novels of his are 'Homeless' (1853); 'The Heir' (1865); and 'The Raven' (1867); he also wrote a few dramas, and his autobiography (1877). His novels are most remarkable for the skill with which he pictures the life of the Jews.

GOLDSCHMIDT, Otto, English composer: b. Hamburg, Germany, 21 Aug. 1829; d. London, 24 Feb. 1907. He was a pupil of Mendelssohn and Hauptmann at the Leipzig Conservatory, became a resident of England in 1858, was appointed a professor in the Royal Academy of Music in 1863 and was its vice-principal (1866–68). From 1876–85 he was first musical director of the Bach Choir. He several times conducted the famous Lower Rhine festivals at Düsseldorf. His compositions include the oratorio 'Ruth' (1867), and he also edited with Sterndale Bennett 'The Chorale Book for England.' In 1852 he married Jenny Lind (q.v.).

GOLDSCHMIDT PROCESS, method of reducing metallic compounds by aluminum, perfected by Dr. Hans Goldschmidt of Essen, Germany, which overcomes the difficulties hitherto involved through the extremely high temperature necessary to secure the reaction and the explosive violence attendant upon it.

GOLDSMID, Sir Francis H. (1808–78), the first Jew to become an English barrister (1858), entered Parliament in 1860, representing Reading until his death. A generous contributor to charities, especially University College, London. He was active in the liberal movement and shared the reputation of members of his family in Parliament and English life. Of these may be mentioned his father, Sir Isaac Lyon Goldsmid (1778–1850), chiefly known for his benefactions to education and his efforts in behalf of Jewish emancipation and the passage of the Jews' Disability Bill. Sir Julian Goldsmid, nephew of Sir Francis (1838–96), was many years in Parliament and an influential figure by reason of his ability and wealth. Sir Frederic J. Goldsmid (1818-1908) retired as major-general in 1875, after serving in the China War, in the Crimea and in Egypt. He was distinguished, too, in exploration and surveying. The Goldsmid family sprang from Aaron Goldsmid (d. 1787), a Dutch merchant who settled in England about 1763. His two sons, Benjamin (c. 1753–1808) and Abraham (c. 1756–1810), were noted for their public and private benefactions. They wielded great influence in the money market as bill-brokers during the Napoleonic War.

GOLDSMITH, Oliver, Irish poet and miscellaneous writer: b. Ireland,* 10 Nov. 1728; d. at 2 Brick Court, Middle Temple, London, 4 April 1774. Goldsmith, like Richardson, "flowered late." The son of a poor clergyman of the Established Church, his childhood was spent at Lissoy, a hamlet in Westmeath, lying to the right of the road from Ballymahon to Athlone. From the first instruction of a female relative, he passed to the care of the village schoolmaster, a roving old soldier who had fought in Queen Anne's wars. Thence he went to schools at Elphin, at Athlone, at Edgeworthstown, earning nowhere any particular distinction. He was regarded as dull and heavy intellectually, although physically he was robust and athletic. Now and then he surprised his family by an unexpected gift of repartee, and he scribbled verse early. But nothing occurred in his boyhood to favor the supposition that a genius had been born into the world of letters.

In June 1744 after anticipating, in his own person, the plot of his later comedy of 'She Stoops to Conquer,' by mistaking the house of a gentleman at Ardagh for an inn, his father, impoverished by the attempt to portion his eldest daughter, sent him to Trinity College, Dublin, as a poor scholar. His college career was not brilliant. His tutor was hard and unsympathetic, and devoted to the mathematics which Goldsmith (like Gray and Swift) detested, though he had some faculty for "turning an ode of Horace." He got a small exhibition in 1747, a success which he unwisely celebrated by a mixed party in the garret which passed for his "rooms." Into this rejoicing his incensed tutor burst abruptly, and by knocking down the host, dispersed the guests. Thereupon his humiliated pupil ran away, vaguely bound for

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* The exact place of Goldsmith's birth is doubtful. It is usually said to be Pallas in Longford, but others make it Elphin, Roscommon.

America. Matters were, however, patched up by his elder brother, and he returned to college, where, in February 1749, he took a low degree.

He left no memories behind him but his name scratched upon a window-pane, a battered lexicon scored with «promises to pay,» and the tradition that, after writing songs at five shillings a head for the Dublin ballad singers, he used to steal out in the twilight to hear them sung. When he returned to his widowed mother (his father had died during his college days), he had no more pressing vocation than to fish in the river Inny, blow the German flute and take the chair at the village «free and easy.» When he was old enough, he presented himself for ordination, but was rejected for incompetence, aggravated by red breeches. He next tried tutoring; made a little money, bought a good horse and started again for America. In brief space he returned on a miserable hack, and without a penny. Law was then essayed. Being equipped with £50 for study in London, he lost it on the road to a sharper. Finally he did reach Edinburgh, to study physic. Upon the same pretext he went from Edinburgh to Leyden. Then, being again without means, he started — like Holberg — to make a kind of Grand Tour on foot through Europe. He visited France, Germany, Switzerland and Italy, flute-playing and disputing at convents for a subsistence. In February 1756, being then 27, he landed at Dover with a few halfpence in his pocket. He had, however, sent home to his brother from Switzerland a fragment of the poem which afterward became ‘The Traveler.’

For the moment literature seems to have been the last thing in his thoughts. He is suspected to have tried strolling; he is known to have been an apothecary's assistant, a poor physician (with a dubious foreign diploma), a reader and corrector of the press to Richardson the novelist, and an usher in a Peckham «academy.» Here, at last, he drifted into authorship, being engaged by Griffiths of the *Monthly Review* to supply «copy» of all work for that serial. With Griffiths he speedily fell out; and eventually found his way back to Peckham, where his old employer promised to get him a foreign medical appointment. Meanwhile he published (1758), under a pseudonym, a translation of the ‘Memoirs’ of Jean Marteilhe of Bergerac, a Protestant condemned to the galleys for his religion. Failing, for unknown reasons, to take up the post at Coromandel which had been found for him, he tried to pass as a hospital mate. He was rejected at Surgeons' Hall in December 1758 as «not qualified.»

We next hear of him as living in a tiny court off the Old Bailey, writing a high-titled ‘Enquiry into the State of Polite Learning in Europe.’ This, superficial of necessity, but bright and epigrammatic, attracted some notice. He began a miscellany called *The Bee*, and was employed on various periodicals. Then Smollett enlisted him for the *British Magazine*; and for Newberry's *Public Ledger* he wrote the delightful essays afterward collected in 1762 as the ‘Citizen of the World.’ By this time the skies were opening. He had moved into better rooms at 6 Wine Office Court, Fleet street, made the acquaintance of Johnson, and was certain of employment. Besides dispersed papers, he wrote ‘Memoirs of Voltaire,’ a ‘History of Mecklenburgh,’ a ‘Life of Richard Nash’ (of Bath). What is more, he was writing the ‘Vicar of Wakefield,’ for in October 1762 he sold a third share in that book to Benjamin Collins, a Salisbury printer, for £21. How this is to be reconciled with Boswell's story that Johnson sold the entire novel to a bookseller for £60 has not yet been explained; but internal evidence shows clearly that parts of the book were written in 1762.

His further career must be rapidly abridged. After much compiling for Newberry, which included an excellent ‘History of England’ in letters, he published, in December 1764, his first long poem, ‘The Traveller; or, a Prospect of Society.’ Its sweetness of versification, its simple language and the beauty of its descriptions at once distinguished it as the best poem since the death of Pope. Its popularity drew attention to its writer's other work, and a volume of his collected essays followed in 1765. Upon these came ‘The Vicar of Wakefiel,’ 1766. Its success, strange to say, was only gradual, but it continues to this day; and its inimitable types, its happy mingling of Christianity and character, its wholesome benevolence and practical wisdom are not likely to be forgotten. The Primrose family are citizens of the world.

Goldsmith's next triumph was on the stage. In January 1768 he managed, after many vexations, to get a play produced at Covent Garden. This was ‘The Good Natur'd Man,’ in which he attempted to combat the insipid «genteel» comedy made popular by French models and the novels of Richardson. His efforts were only partially successful, though his profits were sufficient to enable him to move into fresh chambers in the Temple, whence, in a maze of miscellaneous «book-building,» he sent forth, in May 1770, another and a still more beautiful descriptive poem, ‘The Deserted Village.’ It was received with enthusiasm, and speedily ran through three editions. Three years later, though always hampered with task-work, he crowned his achievements with the comedy of ‘She Stoops to Conquer.’ In the interval which had elapsed since ‘The Good Natur'd Man,’ «genteel» comedy had passed into the «sentimental» stage. But Goldsmith's bustling piece, skilful in construction and brimming with humor and character, gave a knock-down blow to the lachrymose drama, which was eventually dispatched by Sheridan. A few months later, in April 1774, Goldsmith died, and was buried in the Temple burying-ground. The Literary Club, to which he had belonged, erected a tablet to him in Westminster Abbey, with a well-known epitaph by Johnson. ‘Retaliation’ and the ‘Haunch of Venison,’ two of the happiest of his lighter poetical efforts, were published posthumously.

Goldsmith had many weaknesses. He had few physical advantages; and he was both sensitive and self-conscious. But he had the best heart in the world. «Let not his frailties be remembered,» said his rugged old mentor, Johnson; «he was a very great man.» He was also a very great writer. To have died at 46, after 30 years of purposeless «eddying round and round,» the author of two admirable didactic poems, an unique novel and a comedy which still holds the boards, to say nothing of his essays and familiar verse, which are models in their way, is certainly to deserve a high position in the work of his century — a position which he retains to-day in virtue of his simplicity, his kindliness, his humor and the indefinable gift of genius. See She Stoops to Conquer; Vicar of Wakefield; Deserted Village, The; Traveller, The.

Bibliography.— Goldsmith's life has been written by Prior (1837); Forster (1848–71); Washington Irving (1844–49); William Black, 'English Men of Letters' (1878); and Austin Dobson, 'Great Writers' (1888; revised American ed., 1899). His «miscellaneous works» were first published in four volumes (1801), with the so-called 'Percy Memoir.' Then, in 1820, came a «trade edition,» followed by Prior (1837), and Cunningham (1854–55). The fullest modern edition is that of Gibbs in 'Bohn's Standard Library' (5 vols., 1885–86). There are editions of the poem by Mitford 'Aldine series' (1831–95); Bolton Corney (1845), and in the 'Temple Library' (1889). A reprint of Marteilhe's 'Memoirs' was published in 1895, and a fac-simile reprint of the first edition of the 'Vicar of Wakefield' with a bibliography in 1885. Consult also Boswell's 'Johnson'; and the Wakefield edition in 12 volumes (1900); Thackeray's 'English Humorists,' and *Edinburgh Review,* 1846 by Lord Lytton.

Austin Dobson,
Author of 'Life of Goldsmith,' etc.

GOLDSMITH BEETLE, an attractive northern dung-beetle (family *Scarabaeidæ*) measuring nearly an inch in length and shining like burnished gold. It is most abundant during May and June, flying principally at night; and, although it feeds on the foliage of various shade and fruit trees, seldom does much harm. The name is extended by entomologists to all scarabs of the sub-family *Rutelinæ*.

GOLDSMITH MAID, famous bay trotting mare, sired by Abdallah. She held the world one-mile trotting record in 1871–74, taking it from Dexter in 2.17 and losing it to Rarus in 2.13¼. She lowered the record to 2.14 before losing it. Her racing career lasted from 1866 to 1878.

GOLDSMITHING. Strictly, the art of working in gold. More broadly, the term is used to include the working in the precious metals (gold, silver, platinum, etc.). In a still broader sense, the jeweler is often termed a goldsmith although his product consists largely of pieces of personal adornment in which stones (precious, semi-precious and otherwise) are the main features and the setting (frequently of other than the precious metals) is often a matter of minor importance. The subject as here treated refers to the manipulation of gold for ornamental purposes. (See also Silverware). The chief decorative processes used by the goldsmith are: Repoussé or driven work, pierced work, chasing, carving, filigree, enamel work in cloisonné and champlevé styles, niello, etc. Enamel work (except as a subsidiary feature) is done chiefly on or in copper and has been treated elsewhere. (See Enamels). On account of the high cost of gold the process of *casting* is little used as it leaves too thick a relief. See Repoussé.

Technology.— Treated in simple language, the following is the general method of the artist-goldsmith (as differentiated from the modern factory technique): The work is started with a piece of well-annealed sheet metal. This is reduced by hammering, or rolling between steel rollers, to the desired thickness. It is now beaten out with hammers and punches into form and decoration — relief and intaglio (*creux*). Chasing, chiseling and finishing follow. The product of the metal worker has been classified as «flat-ware» and «hollow-ware»; the treatment for flat-ware (plates, dishes, saucers, spoons, etc.) is simply one of hammering and punching, etc., the embossed work from the under or negative side, then turning the piece (*blank*) over and working the depressions from the positive side. In hollow-ware (bottles, ewers, etc.), where access to the interior is very limited, the difficulty is overcome by the use of arms (*swages*) projecting from the anvil or bench and which enter the interior of the vessel. The «snarling iron» is one of the most useful of these. The ends of these stakes have different forms at the extremities and afford an inner resisting medium on which the hammer can operate externally to create embossed ornament. For the intaglio or depressed work the vessel is filled with a substance (usually pitch) easily melted yet sufficiently hard, when cold, to afford just enough resistance to the blows of hammer and punch. When the work is finished the substance is melted and poured out. The number of tools formerly used by the artist-goldsmith were more or less numerous, but were fashioned by the individual worker according to his desires. The fact that nomadic tribes, even to the present day, such as Arabs, Csechs, Tziganes, etc., are able to produce on their wanderings very artistic, if not large, pieces of goldsmiths' work proves that a heavy «kit» is not so much the requirement as an extended knowledge (handed down from one generation of the family to the next) of the possibilities inherent in each implement. An anvil, vise, drawplate (for wire), dividers, calipers, hammers with different shaped «panes» (or «peens») and «faces,» punches with various faces, scorpers (for lowering the surface by removal), set of engraving tools, swages, soldering irons, blowpipe, etc., are a few of the necessary tools of a practising goldsmith; but the modern factory outfit adds: draw-bench, turning lathe, polishing lathe, planishing tools, sets of shears, «sparrow hawk,» numerous pliers, nippers, treblets, frame-saws, corn-tongs, gauges, micrometer, drill-stock, etc.

History.— The art of working gold, though in crude manner, dates back to prehistoric times. The ancient Egyptian goldsmith did cloisonné work with inlays of colored stones and pieces of glass paste. To them we owe the delicate chain-link termed «trichinopoly.» Their minute granulated work was done 3,000 years earlier than that of the Etruscans; their pretty gold necklaces with numerous drops were in such common use that the word necklace (*nub*) was symbol and term for gold. Gold bead anklets were worn between 8,000 and 5,000 B.C. Their astonishingly artistic gold pectoral ornaments, pierced, carved and inlaid with colored stones, prove the high state of their goldsmiths in art and execution. The ancient Hebrews derived their knowledge of the art from their enslavement in Egypt and from Phœnicia. They made golden earrings, finger-rings, bracelets, chains; the noted seven-branched candlestick and altar vessels of Solomon's temple and the king's table service were of gold. The Greeks in the 8th and 7th centuries B.C. established colonies from Marseilles to the Crimea and their goldsmiths' work followed in their trade routes. The Scythians had wealth and loved golden ornaments and Greek pieces were plentiful with them, as is attested by the frequent discoveries of gold ornaments in the graves. The Etruscan gold jewelry of beautiful design and such extraordinary delicacy with its minute filigree and granulation is ever a cause of wonder to this day. Even the conceited spirit of the great Cellini, when asked to make a duplicate of a piece of this antique ware, declared that Etruscan jewelry was impossible of imitation. The Greek sculptors in the days of their greatest fame used goldwork to adorn their ivory statuary (*chryselephantine*); even the great Phidias was a goldsmith. Mys was noted for his gold acanthus carving, also Theokles, Canachus, Smilis, Athenocles, Acragas, Theodoros of Samos were noted among the ancient Greeks for their creations of golden figures, masks and carved plant life. They placed an embossed gold-piece in the bottom of their patera (*emblemata*), they used gold ornament on their furniture, even made furniture entirely of the precious metal. At a festival in honor of Alexander 1,000 guests had a change of gold plates and cups at each course. From the Tène period (5th to 1st century B.C.) we find sword-hilts and large bronze brooches (*fibulæ*) decorated with gold by the old northern nations, also Celtic gold coins consisting of thin «dished» (concavo-convex) decorations, known as «bracteates,» made in imitation of antique Grecian pieces; also we find long arm spirals and arm rings, neck-rings, diadems, large vessels, even axe-heads of massive gold of Celtic origin. The ancient Romans do not appear to have been great gold artificers as the Greeks produced all their rich pieces for their palaces, galleries, etc.

Etienne De Laulne's Goldsmith's Shop.

Byzantine goldsmiths' work consists largely of doublets, stones cut *en cabochon,* gem plaques, set in relief and enriched with a groundwork of filigree or sprays of Byzantine acanthus. Examples of this are the golden throne of Theophilus, the crown of Charlemagne. (See CROWNS). Cloisonné enameling came in vogue in this time and persons wore many jewels and trinkets. The «pala d'oro» of Venice was a 10th century product of the Byzantine goldsmiths. Gaul saw a renaissance of goldsmithing in the 5th century and enamel work is claimed by some ancients to have originated in Gaul. They produced torques, bracelets and all kinds of warrors' trinkets with simple plait and carved decoration. All we possess of the Merovingian period is arms and fibulæ. In the 6th century we hear of Bishop Abbo, Saint Eloi, his pupil, the abbot Thilo of Solignac monastery in the 7th century, all had their goldworking schools. In the 11th century, Bernward, bishop of Hildesheim, had a school of goldsmithing, and he himself executed fine work, specimens of which still exist in that city. The treasure of Guarrazar (see CROWNS) is evidence of the clever workmanship done by the Visigoths of the 7th century. In Italy the Lombards did lovely work and the gold antependium made for Basle Cathedral (now in Cluny Museum), dating late 10th or early 11th century, was one of their best works. Jewelry, bookcovers, crosses, etc., still extant are from their workshops. The Romanesque period is characterized by architectural forms, the reliquary chests (chasses) are miniature roofed edifices with gables and arcades containing figures of saints, etc. Filigree and simple geometrical decoration are the groundwork for stone plaques and cabochons. The Saint Remigius chalice of Rheims is a noted example of this period, all of which work is ecclesiastical.

The Gothic period arrived with the 13th century and goldsmithing became work of the laity as well as of the monastery. Guilds were formed to protect the artisan and raise the level of his art. Examples of the 13th to 15th centuries are rare. The reliquary of Nivelle belongs to the 13th century. Noted workers were Jean de Montreux, Claux de Friburg, Henri the miniaturist, Hannequin-Duvuvier, goldsmith to the king in the 14th century, Giovanni of Piza, who with his brothers worked in the cathedral at Arezzo. All Europe, by the 14th century, was fired by Italy's wonderful work. Ognabene of Pistoia had made the great cathedral altar; Cione was decorating the altar of Saint John at Florence. Flemish artists began to exert their influence and we have the names of Jehan Barbier, Jehan Fernicle, Hans Croist, etc. In the 15th century we have the luxurious dukes of Burgundy collecting the rarest objects from the goldsmiths' workshops. The collection left by Louis, Duke of Anjou, had 796 articles of solid plate. The cities were making presentation of plate to the kings, the princes were making presents to other courts. Ecclesiastical reliquary caskets (*chasses*) had become veritable Gothic edifices with windows, trellised crestings, pinnacles, clock-towers. The "nefs" of the laity were great examples of hammered work. We find the names of such noted goldsmiths in France as Dufour, Guillaume, Boey, Jean de Clichy; in Italy worked the great artists, Pollajuolo, Verrochio, Francia Antellotto Bracciaforte, Maso Finiguera, Andrea Arditi, Tommaso Ghirlandajo, besides Lorenzo Ghiberti who founded an entire school. Luca della Robbia, the goldsmith, was taking up sculpture. It was the Italian Renaissance in its zenith. In Germany were noted goldsmiths, Hans Greiff (Nüremberg), Heinrich Hufnagel (Augsburg).

In the 16th century France came under the influence of the Italian Renaissance; Benvenuto Cellini went to Paris in 1537 and started a school of goldsmithing. Cellini had made a great reputation in Florence with his superlative art in gold. Ever in trouble from his temper he was glad to expatriate himself for a season. The French love of luxury and the beautiful developed in a wonderful degree. And it was during one of his visits to Paris that Cellini is said to have produced the celebrated 'Nymph of Fontainebleau.' But an edict was sent forth forbidding the use of gold in table services. It soon fell into desuetude. Beautiful models emanated from Delaulne and Woeirio, designs in pewter from Briot and grand executive talent is shown by such goldsmiths as Desjardins, Ramel, Delahaie, Margot. Germany showed her Renaissance tendency in the works of Wentzel Jamnitzer, Peter Vischer, etc., though her Gothic traditions retain some influence in their work. The peculiar Teutonic temperament is disclosed in her mountings of coconuts and ostrich-shells, her bulbous hanaps and pineapple (Ananas) cups. The spreading of the design engravings of Holbein the Younger, Dürer, Solis, etc., helped the art propaganda, and the 16th and 17th centuries produced works from Flemish and Dutch experts such as de Bry, Collaert and the two Vianens of Utrecht. The early 17th century saw the brothers Mosbereaux working in the Louvre, and other artists in gold such as Carteron, de la Barbe, de Roberdet; Ambrogio Foppa (Caradossa) was gaining fame in Milan, and Mignot at Augsburg. Under Louis XIV, later in the century, Lebrun's master mind was getting grand effects from the Gobelins, and gold decorative work came from the hands of de Villiers, Loir, Lepautie, Ballin, Delaunay. But the "grande Fonte" (lasting six months in 1688 and 1689) swept all the fine pieces of goldsmithery in France into the melting-pot for war funds. With the entering 18th century we see the grandiose and pompous style of "le Roi Soleil" taking on a tenuous and delicate form from the designs of Bérain; Briceau carried the idea into goldsmithing. Regency gold decorative art in France produced large objects in gold but sparingly for it was forbidden. Julien Delafontaine did fine jewelry. The style in general was to suppress all excess in gold decoration, yet beauty of effect was produced. The goldsmithing work of Louis XV ran to fantastic decoration such as had become the fashion of all the arts. Some restraint is found in the *rococo* and *rocaille* scrolls and vegetable motifs of Juste-Aurèle Meissonier and goldsmith Pierre Germain. Roettiers showed talented work. This was the snuff-box collectors' period, and the goldsmiths were equal to their patron's desire for a renewal every week to his stock of *tabatières* of luxurious decoration. Fine gold decoration was displayed on milady's fans, *bonbonnières*, scissors; the dandy's watches, cane-heads, swordhilts, etc. Under all the Louis's French taste ruled over all Europe; Paul Lamerie, the French goldsmith, at the English capital set the style for that court from his workshop. The work of the goldsmith under Louis XVI was sober to severe in decoration; Auguste and Chéret display the style in vogue. In the return to the antique for form and decoration during the empire period lies its true characteristic. Notable goldsmiths were Odiot, Thomire, Biennais, Fauconnier, the Fannières, Froment-Meurice, Christofle.

Modern Goldsmithing.— The art of the goldsmith has changed to the industry of goldworking — the factory has taken the place of the creator's shop. Paris shows pretty and artistic handwork from a Lalique and other true artists, but the rue de la Paix show windows contain chiefly gold ornament turned out by the die from a stamping machine. Under A. Castellani of Rome industrial jewelry has been produced in late years in remarkably close likeness to antique Greek, Etruscan and Roman examples, and the output has been shipped to the masses of every nation at remarkably low prices in great quantities. England has its jewelry factories in Sheffield and Birmingham; Germany's goldworking factories are located at Pforzheim, Hanau, Schwabisch-Gmünd, Berlin, etc. The United States has goldworking industries on a large scale in the Oranges, Newark, the Attleboros and Providence. But individual pieces made by hand in exquisite taste are not going to become extinct while

London has its Bridges or New York its Tiffany.

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Clement W. Coumbe.

GOLDTHREAD, a low, smooth ranunculaceous herb (*Coptis trifolia*), closely related to hellebore, whose evergreen leaves are all basal, long-petioled and divided into three serrate broadly obvate leaflets; and the flowers small and white on scapes. The root consists of long, bright yellow, bitter threads. This plant contains a white alkaloid called coptine, and a tea made of it is tonic. It grows in boggy woods throughout northern North America. See also Coptis.

GOLDTIT. See Verdin.

GOLDZIHER, gōlt'sē-är, **Ignaz,** Hungarian Orientalist: b. in Stuhlweissenburg, Hungary, 22 June 1850. Privat-docent at University of Budapest in 1872, he was commissioned by the government to take a scientific journey through Syria, Palestine and Egypt, spending some time at the Azhar mosque in Cairo, where he attended lectures on theology and law. Since his promotion to professorship (1894), he has been an exact and untiring writer in Orientalia, Arabic and Hebrew topics in particular. His contributions to learned societies and congresses have been numerous; he gained the large gold medal at the Oriental congress in Stockholm (1889). In 1890 he became lecturer on religion and philosophy at the Budapest rabbinical seminary. While he has won special eminence for his researches in the field of Arabic traditions and the history of the civil and religious law of Islam, he has written many important works on Oriental history and the science of religion. His 'Mythos bei den Hebräern und Seine Gechichtleche Entwiekelung' was translated into English by R. Martineau (London 1877). Some of his theories have met much opposition but his erudition is unchallenged.

GOLETTA, gō-lĕt'tä, **Africa,** the port of the city of Tunis, from which it is 11 miles north. In the new quarter are the bey's palace, a large dock and an arsenal defended by a battery. Pop. about 3,000.

GOLF, anciently known as Goff, Gouff or Gowff, a game of Dutch origin, but generally identified with Scotland, where as early as 1457 the local Parliament inveighed against its abuse. The Edinburgh town council in 1592 forbade the playing of the game on the Sabbath and offenders were severely punished. The game was played for the first time in England after the accession of James I, whose Scottish train played the game on Blackheath. For over two centuries, however, the game did not become popular in England. In Scotland it had spread throughout the land and many societies and clubs were formed for the practice and promotion of the game, of which the chief was the Royal and Ancient Golf Club of Saint Andrews, established in 1754, and now the national club of Scotland. About the middle of the 19th century the game spread to India, Canada and the United States. The central authority in the United States is the United States Golf Association, organized in 1894 with four clubs. It now consists of about 200 clubs; and there are about 750,000 golfers in the United States. The word, derived from the German *Kolbe,* in Dutch *Kolf,* signifies a club. *Kolf,* resembling golf, is a very ancient pastime in Holland and Belgium, where it is usually played on the ice.

The modern game of golf is played with clubs and balls on specially prepared courses called *links,* generally laid out on open suitable grounds. The simplicity of the game is attractive to beginners, but with a little experience the beginner learns how necessary are practice, skill and judgment to make one play well enough to be classed as a good golf player. The prime necessity is plenty of room. The ground best suited for the purpose is a reach of undulating country with a sandy soil, short, crisp turf and plenty of holes or ruts, the latter forming the *hazards* — natural obstacles — or *bunkers* — artificial obstacles — necessary to prevent the game from being too easy. The *links* should not be less than three miles round nor more than five. Throughout it are distributed 18 artificial holes at any distance from 100 to 500 yards apart. The holes are four and one-half inches in diameter, and each is surrounded with a *putting green,* a space 60 feet square and made as smooth as possible to enable the player to aim with accuracy. The other requisites are two small balls about two inches in diameter and made of gutta-percha, and a number of *clubs* adapted to the various contingencies likely to arise.

There are two styles of clubs, the wood and the iron; these consist of a long wooden handle, preferably of hickory, securely attached to a head of beech wood, or of steel as the case may be. Altogether there are 19 shapes of clubs, but six are usually sufficient for a player's needs. The different clubs are used under different circumstances; for example, the chief wooden-headed clubs are the *driver* and the *brassy*, the first being used for driving the ball a long distance, and the latter, which is shod with brass, being employed in special situations, as when the ball is in a hollow. The club called the *putter*, used when the ball is near the hole, has the head either of wood or of iron, The iron-headed clubs are the *cleek*, the *iron*, the *mashie* and the *niblick*, all adapted for special purposes. The clubs are used for driving the balls into the holes, and the object of the player is to get his ball into all the holes successively with the fewest possible strokes. When played by two persons the game is called *singles;* when played by four persons in pairs, it is called *foursomes*. There are two chief methods of playing the game, known as *match play* and *medal play*. In the former, two players are usually pitted against each other. Attended by their *caddies*, boys carrying the bags containing the clubs, the players start from the *teeing* ground where one of them begins the match by placing his ball on a small heap of sand, or on an artificial rubber cone, known as a *tee*, and driving it as near as possible to the first hole. A good driving stroke from a tee would be 200 yards. The record, made at Saint Andrews, Scotland, is 280 yards. The other player does the same with his ball, after which the player whose ball is farthest from the hole plays again. They continue thus until both balls have been holed. The player who takes the fewest strokes to do this is said to win the hole and counts one, and if both have taken the same number of strokes the hole is halved and neither counts. Having *holed* his ball the player takes it out, *tees* it again and starts out for the next hole. Much of the interest of the game depends on the skilful play required to avoid the *hazards* and *bunkers*, scattered over the course, or to get one's ball out when it lands in a difficult spot. In *medal play* the winner is the player who goes the round of the course in the fewest possible strokes irrespective of whether he had a majority of holes or not. Various modifications of these two modes of scoring are in use. A hole match may be won before the round is completed, as, for instance, when one competitor is four holes ahead with only three still to be played. When one player has a lead equal to the number of holes still unplayed, he is said to be *dormy* that number of holes, thus, a player when *dormy three* has a lead of three after playing the fourth last hole, in which case, though he may not win, he cannot lose. The central authority on the game in America regulating the various championships, etc., is the United States Golf Association organized 22 Dec. 1894, with which is now affiliated over 200 clubs throughout the country. Consult Beldan, G. W., ‘Great Golfers’ (London 1907); Braid, James, ‘Advanced Golf’ (Philadelphia 1908); Clark, ‘Golf: A Royal and Ancient Game’ (New York 1899); Haultain, Arnold, ‘The Mystery of Golf’ (2d ed., New York 1910); Hutchinson, H. G., ‘The New Book of Golf’ (ib. 1912); id., ‘Golf Greens and Green Keeping’ (London 1906); Hilton and Smith, ‘The Ancient and Royal Game of Golf’ (London 1912); Lee, ‘Golf in America’ (New York 1895); Taylor, ‘Origines Golfiance’ (Woodstock, Vt., 1912); Travers, Jerome D., ‘The Travers Golf Book’ (New York 1913); Travis, ‘Practical Golf’ (1901); Tulloch, W. W., ‘Life of Tom Morris, with Glimpses of St. Andrews and Its Golfing Celebrities’ (London 1907); Vardon, ‘Complete Golf’ (New York 1905).

GOLGI, Camillo, Italian neurologist: b. Corteno, 1843. He studied at the University of Pavia, and engaged in the practice of medicine at Abbiategrasso. He was appointed to a professorship at Siena, and afterward at Pavia. He specialized in the study of nerve tissues and made a vastly important contribution to physiology when, in 1885, he demonstrated the fact that the nervous system is not a network. A further achievement was his identification of a class of nerve endings in tendons which were named in his honor, «organs of Golgi.» He is the discoverer of three malarial parasites. In 1906 the Nobel prize for medicine was divided between him and Cajal. He has contributed extensively to the Italian medical journals, the Italian medical encyclopædia, and his collected writings were published in three volumes. (1903.)

GOLGOTHA or CALVARY, Jerusalem, from Hebrew and Latin *calvaria*, signifying «the place of a skull,» the site of Christ's crucifixion A.D. 29. The traditional site as discovered and determined by Bishop Macarius in 325 at the request of Emperor Constantine, is now enclosed among the buildings of the Church of the Holy Sepulchre. See Calvary; Holy Sepulchre, The.

GOLIAD, Tex., city, county-seat of Goliad County, on the San Antonio River and the Southern Pacific Railroad, about 45 miles from the Gulf and 168 miles southwest of Galveston. There are interesting ruins of the ancient Spanish mission, a courthouse and a public library. The city contains several cotton gins and is the centre of a cotton growing and stock raising district. Goliad gets its name from Hidalgo (q.v.), the patriot priest of Dolores, who in 1810 led the revolution in Mexico against Spain. When Goliad was founded the people did not dare to name it Hidalgo, so dropping the silent H and transposing the letters, they made the word Goliad. This place was the last site of the ancient mission of La Bahia del Espiritu Santo (1749). This mission was first founded at the place where La Salle built Fort Saint Louis in 1685. Goliad was the scene of a bloody contest (1812) between the so-called «Republican Army of the North,» under Magee and Gutierrez, and the Mexicans. Here Magee died, evidently assassinated. In the Texas revolution (1835) Goliad was a point of strategical importance to the Texans. It was captured by Ben Milan and Collingsworth and became the base of military operations. The independence of Texas was declared here 20 Dec. 1835. Ira Ingram and Philip Dimmit were the leaders in formulating this declaration, and at the meeting there were 92 soldiers and all the citizens of the town. The official declaration of independence was made at Old Washington, 2 March 1836. In Goliad, on Palm Sunday, 27 March

1836, the Mexican commander, Urrea, caused to be slaughtered 300 unarmed men who had surrendered, Fannin (q.v.) and his command. These defenseless men had been promised life and liberty before being marched out in squads and shot down like dogs. Urrea claimed he acted under orders from Santa Anna (q.v.). Afterward a rallying cry of the Texas troops under Sam Houston was "Remember Goliad." In 1902 Goliad was visited by a disastrous cyclone which swept away almost the whole town. Pop. 2,250.

GOLIARDERY, gō'lĭ-är'dėr-ĭ, the name given to the *Carmina Burana*, a series of satirical Latin poems of the 13th century. They were the productions of the self-styled Goliardi, mediæval wandering students, disciples of the mythical Golias. While attacking the abuses and vices of the period, especially those existing in the Church, they glorified also the love of nature, women and wine. This naturally antagonized the ecclesiastical mind which was prone to exaggerate into grave sins what ordinary men would consider as mere peccadilloes. From a classical standpoint the majority of the songs are generally below criticism; from a moral point of view, many of them are vigorous and healthful, and are popular among German students of the present day. Consult Schmeller, 'Carmina Burana' (1894); Symonds, 'Wine, Women and Song' (1884).

GOLIATH, gō-lī'ath, a giant of the Philistines, slain by David. In the war between Saul and the Philistines, Goliath of Gath came forward daily to challenge the champions of Saul's warriors to single combat. The youthful David, armed with a sling and pebbles, answered the challenge, and overcame the giant. The Philistines were routed and the victory was won. The story is told in Samuel xvii. In another place (2 Sam. xxi, 18–22), the vanquishing of Goliath is ascribed to Elhanan, one of the greatest of Saul's warriors. As this tradition is earlier than the David legend, it is probable that the transference of the glory of the victory from Elhanan to David was due firstly to a confusion in names, since Elhanan was the son of Dodo; or secondly, that it was resorted to as a means of explaining David's rapid rise in the favor of Saul.

GOLIATH BEETLE, one of the huge scarabe beetles of the cetonian genus *Goliathus*, distinguished by their large size, the horny processes on the head of the male, and the teeth-bearing lower-jaws. The name specifically belongs to *G. giganteus* of the Gold Coast, which is four inches long, and is chalky-white, broadly and variously marked with black. It feeds almost entirely on the sap of trees. Compare Hercules Beetle.

GOLITZIN, gō-lit'sēn', Prince **Boris Borisovich**, Russian physicist and academician: b. 1862; d. Peterhof, 17 May 1916. He graduated at Naval Cadet Corps 1880; entered Strassburg University 1887; was lecturer at Moscow University 1892; assistant professor of physical science at Yuriev University, Dorpat, and assistant of the Academy of Sciences 1893. From 1899 to 1905 he was manager of the government printing office; president of the Seismological Association 1911.

GOLLANCZ, Israel, English scholar: b. London, 1864. He was educated at University College, London, and at Christ's College, Cambridge. He was Quain English student and lecturer at University College in 1892–95; university lecturer in English, Cambridge, 1896–1906; and since has been University professor of English language and literature at King's College, London. He is a Fellow of the British Academy and has acted as its secretary since its foundation in 1903; and was honorary secretary of the Shakespeare Tercentenary Committee. Author and editor of 'Pearl' (1891); 'Exeter Book of Early Saxon Poetry' (1895); 'Temple Shakespeare' (1894–96); 'Hamlet in Iceland' (1898); general editor 'The Temple Classics'; 'The King's Library'; 'The Book of Homage to Shakespeare' (1916), etc.

GOLOMYNKA, or **OIL-FISH**, a goby-like fish (*Comephorus baikalensis*) found only in Lake Baikal, about a foot long, destitute of scales, and very soft, its whole substance abounding in oil, which is obtained from it by pressure. It is never eaten.

GOLONDRINA, green house swallow (*Tachycineta leuccorrhoa*) of South America, similar to the white-bellied tree swallow (*Tachycineta bicolor*) of North America. Originally it nested in hollow trees but with the coming of man it nests beneath the eaves of buildings. It is white breasted with green above except for a touch of white on the rump. Consult Hudson, 'Naturalist in La Plata' (1903).

GOLOSHES (Fr. *galoche*, "a patten, clog or wooden shoe"): (1) a kind of wooden clog, with a joint at the instep and upper leathers like those of very low shoes, worn in the Middle Ages. (2) India-rubber overshoes, first manufactured in the United States and introduced into Great Britain about 1847. The term is now restricted to the latter meaning, and is used mostly in England, very rarely in the United States. See India-rubber; Rubber Manufactures.

GOLOVNIN, Alaska, native settlement on Golovnin Bay, 10 miles east of Bluff. There is a Swedish Evangelical Union Mission and a school under the direction of the United States government. The natives are largely engaged in raising reindeer, of which they own more than 2,000 head. Pop. about 200.

GOLTZ, gōlts, **Kolmar**, Baron von der, German soldier and military author: b. Bielkenfeld, East Prussia, 1843; d. Asiatic Turkey, 19 April 1916. He was educated at the Berlin Military Academy, had seen extensive military service, having fought in the Austrian campaign and having been on the staff of Prince Frederick Charles in the Franco-Prussian War of 1870–71. At the close of the Franco-Prussian War, he was appointed to the historical department of the general staff at Berlin and for a time was instructor in the Military Academy. In 1883 he was sent to reconstruct the Turkish army and remained in Turkey for 13 years. He was made general of division on his return to Germany in 1896; general of infantry in 1900; commander of the first corps in 1902; general inspector in 1907, and lieutenant-general in 1908. In 1908–10 he was again in Turkey, engaged in reorganizing the army of that country. In 1911 he became general field-marshal and later was inspector-general of the second corps until 1913. In August 1914, after the German armies had invaded Belgium and captured Brussels, he was appointed military governor of the occupied portion of the country, but in November of the same year, he was relieved of this command and sent to Turkey, where he was appointed military commandant at Constantinople, and acting Minister of War. He was instrumental in forming the successful Turkish defense on the Gallipoli Peninsula, and frequently predicted that the Anglo-French fleet would not be able to force a passage of the Dardanelles. In April 1915, he succeeded Gen. Liman von Sanders as chief of the first Turkish army. (See War in Europe). He published 'Lion Gambetta und seine Armee' (1877; French ed. 1877); 'Das Volk in Waffen' (4th ed., 1890); 'Der thessalische Krieg und die türkische Armee' (1898); 'Krieg und Heerführung' (1901); 'Von Jana bis Eylan' (1907); 'Kriegsgeschichte Deutschlands im XIX Jahrhundert' (1910).

GOLTZ, Max, Baron von der, German naval officer: b. Königsberg, 19 April 1838; d. Potsdam, 20 Dec. 1906. He entered the Prussian navy in 1853, received rank as ensign in 1859 and that of captain in 1875. He commanded the German Mediterranean squadron during the Egyptian troubles of 1882; and in 1888 attained the rank of vice-admiral, with the appointment to the command of the Wilhelmshaven naval station. He was retired 13 May 1895 with the rank of admiral.

GOLTZIUS, Hendrik, Dutch painter and engraver: b. Mülebrecht, duchy of Jülich, 1558; d. Haarlem, 29 Dec. 1616. He came of a family of artists. He was taught to paint on glass by his father and his work as a steel engraver was begun under Coornheert, whose limited ability Goltzius soon surpassed. He later worked with Philip Gale, engraving for him a set of prints of the history of Lucretia. In 1590 he traveled in Germany and Italy, and conceived an intense admiration for Michelangelo, whom he imitated rather unsuccessfully. While some of his paintings are in the imperial collection at Vienna, none of them add greatly to his reputation, which is firmly established by his engravings. His portraits are chiefly miniatures and are considered very fine, and he executed an exceptionally good portrait of himself. His skilful use of the burin is ranked with that of Dürer, but he lacked a fine artistic appreciation. Nevertheless, his skill of technique and the free, beautiful lines of his work counterbalance other defects. Excellent examples of his engravings after the masters are afforded by his copies of Raphael's 'Annunciation'; Parmeggiano's 'Visitation'; Bassano's 'Adoration of the Shepherds'; Baroccio's 'Holy Family'; Lucas van Leiden's 'Adoration of the Kings'; and Dürer's 'Circumcision.' More than 300 of his engravings are in existence, and are catalogued in Bartsch's 'Peintre-Graveur' and in Weigel's supplement to that work.

GOLUBOVICH, gō-lǫ-bō'vich, **Girolamo,** Illyrian clergyman and author: b. Dalmatia, 7 Feb. 1865. He was educated at the Franciscan Convent, Jerusalem, entered the Franciscan Order in 1879 and was ordained to the priesthood in 1888. In 1888–89 he was librarian of the Franciscan Convent, Jerusalem, and from 1889 to 1895 he was engaged in missionary and parochial work at Larnaca and Limassol, Cyprus. In 1895 Cardinal Ledochowski conferred on him the title of missionary apostolic. He was successively professor of rhetoric, at the Franciscan Lyceum, Aleppo, Syria, and missionary to the Greeks, Slavs and Italians of Alexandria and Port Said, Egypt, in 1895–96. In 1902–04 he was vicar of the mission of Constantinople. He was appointed in 1898 historian of the Franciscan Mission of the Holy Land and in this capacity visited the libraries of Italy, Austria, Belgium, France and England, to collect and edit many rare documents. He was one of the editors of the works of Alexander of Hales and Bartholomew of Pisa 1904–07; and director of the 'Archivum franciscanum historicum' in 1907–08. After 1909 he was stationed at Florence. He has published 'Serie Cronologica dei Reverendissimi Superiori di Terra Santa' (1898); 'Il trattato di Terra Santa e dell' Oriente di frate Francesco Suriano' (1900); 'Ichnographiæ Locorum et monumentorum veterum Terræ Sanctæ, accurate dilineatæ et descriptæ a P. Elzeario Horn' (1902); 'Bibliotheca Bio-bibliographica della Terra Santa e dell' Oriente Francescano' (2 vols., 1906; 1913). He contributed to 'The Catholic Encyclopedia,' the *Archivo storico italiano Missioni francescane; La Verna*, etc.

GÓMARA, Francisco Lopez de, Spanish historian: b. Seville, 1510; d. 1560. He was professor of rhetoric at the University of Alcalá, took holy orders and afterward became secretary and chaplain to Hernando Cortez. He is reputed to have accompanied Cortez to America, but verification of this is lacking. He wrote one of the earliest histories of America, but as a historian he is notable rather for his easy, graceful style than for authenticity. He wrote 'Historia general de las Indias con la conquista de Mexico y de la Neuva España' (2 vols., 1552–53). A modern edition, with a biography of the writer, is included in 'Biblioteca de autores españoles' (Vol. XXII, Madrid 1884).

GOMARISTS, the ultra Calvinistic party in the Dutch National Church, so called from their leader, Francis Gomar (q.v.).

GOMARUS, Francis, Dutch theologian and the most eminent opponent of Arminius: b. Bruges, 13 Jan. 1563; d. Groningen, 11 Jan. 1641. His parents, upon embracing the Reformed faith, removed to the Palatinate in 1578 and Francis was sent to be educated at Strassburg. In 1580 he removed to Neustadt where he studied theology under Ursinus, Zanchius and Tossanus. He visited England in 1582 and attended lectures at Oxford and Cambridge, being graduated from the latter university in 1584. From 1587 to 1593 he was pastor of a Reformed Dutch church at Frankfort and in 1594 became professor of theology at Leyden where he remained until 1603, when Arminius joined the faculty and disseminated Pelagianism. Gomarus opposed him with considerable success and was aided by Bogermann. Gomarus now became the recognized leader of the opponents of Arminius, who after him came to be known as Gomarists. In 1608 he engaged in personal debate with Arminius before the Assembly of the Estates of Holland and in the following year, in the same place, with four colleagues met five Arminians in debate. When Vorstius succeeded Arminius, on the latter's death, Gomarus resigned his chair and became preacher at Middleburgh in 1611, where he also taught theology and Hebrew in the new Illustre Schule. In 1614 he was made professor of theology at Saumur and in 1618 removed to Groningen as professor of theology and Hebrew, at which post he remained until his death. He took part in the revision of the Dutch version of the Old Testament in 1633. His works were issued in a single volume (Amsterdam 1645). Consult Dorner, J. S., 'History of Protestant Theology.'

GOMBERG, Moses, American chemist: b. Elizabetgrad, Russia, 8 Feb. 1866. He studied at Elizabetgrad Gymnasium, and was graduated at the University of Michigan in 1900. He also studied at Munich and at Heidelberg. He was appointed to the teaching staff of the University of Michigan in 1893 and held successive positions there, becoming professor of organic chemistry in 1904. He is a member of the National Academy of Sciences, and in 1914 received the Nichols medal of the American Chemical Society. He has written numerous articles for chemical journals, notably for the *Journal of the American Chemical Society,* and the *Berichte der Deutsche Chemische Gesellschaft.*

GOMEL, or **HOMEL,** Russia, district town of the province of Mohilev, on the Soje, a tributary of the Dnieper, 108 miles southeast of Mohilev. It is an important railroad junction and has an extensive river trade. Its population is nearly half of Jewish origin, and in 1903 there was a massacre of the Jewish inhabitants. Its industries include sugar refineries, oil and paper mills; and it has a large trade in hops, timber, hemp and linseed. Pop. (with Byelitsa suburb) 79,000.

GOMES DE AMORIM, Francisco, Portuguese dramatist, poet and novelist: b. Avelomar, Minho, 13 Aug. 1827; d. 4 Nov. 1891. He spent his early youth in Brazil, returning to Portugal in 1846. He entered government service in 1851, and in 1859 became librarian of the Ministry of Marines. His years in Brazil had great influence over the work of his later years, as had also Almeida-Garratt, who accorded him much encouragement. He was deeply in sympathy with Garibaldi, and the Revolution of 1848, evidenced by 'Garibaldi' and 'A liberdade.' He wrote 'Cantos matutinos' (3d ed., 1874); and 'Ephemeros' (2d ed., 1866) in verse; the dramas 'Odio de raça'; 'A prohibição'; 'Ghigi'; 'O cedro vermelho,' etc.; in fiction 'Os Selvangens' (1875); 'O remorse vivo' (1876); and a history of the literary movement instituted by Almeida-Garratt, 'Memorias biograficas' (1881). His collected works were published (Lisbon 1866). Translations of his dramas into French were made by Denis and Richon.

GOMEZ, gō'mĕs, **Antonio Carlos,** Brazilian composer: b. Campinas, 11 July 1839; d. Pará, September 1896. He was a pupil at the Milan Conservatory, and had his first opera, 'A noite do castello,' presented at Rio de Janeiro in 1861. His 'Se sa minga' gained notable success at La Scala, Milan, in 1867, and was followed by a series of varying merit, including 'Guarany' (1870); 'Salvator Rosa' (1874) and 'Lo Schiavo' (1889). He wrote the hymn 'Il saluto del Brasile' for the Centennial Exhibition at Philadelphia (1876), and a cantata, 'Colombo,' for the Columbian Exposition (1893). He was director of the Conservatory of Music at Pará, Brazil, 1895–96.

GÓMEZ, gō'māsh, **Estevan,** Portuguese navigator: b. about 1474; d. about 1530. He became an expert pilot in the Portuguese East Indian fleet, sailed in 1519 on Magellan's voyage as pilot of the *Trinidad* and was later transferred to the *San Antonio,* on board which he contrived a successful mutiny and then sailed for Spain. There he was imprisoned, but in a short time set free. It appears that in 1524–25 he was sent by Charles V to explore the eastern coast of what is now the United States and discover a northern route to the Orient. A map executed in 1529 by Diego Ribeira, a cosmographer, marks the territory included between the present States of Rhode Island and New Jersey, Tierra de Gómez. Consult Bourne, 'Spain in America' (New York 1904); Harrisse, 'Discovery of North America' (London 1892).

GOMEZ, José Miguel, Cuban general and politician: b. province of Santa Clara, 1846. He served in the Ten Years' War 1868–78, and in the Revolution of 1906 attained rank as major-general. He was governor of the province of Santa Clara under the first American intervention, and was a member of the constitutional convention, continuing a governor of Santa Clara under President Palma. He was active in the revolution against President Palma in 1906 and was imprisoned until after the second American intervention. In 1908 he was elected President, inaugurated 28 Jan. 1909 and served until 20 May 1913, when he was succeeded by Gen. Mario Garci Menocal. In 1917 he again led a revolt against the government, but was captured, imprisoned and held for trial.

GOMEZ, Juan Vincente, Venezuelan politician: b. San Antonio de Tachira, 1859. He entered political life in 1892 and at the time of President Castro's flight to Europe he, as vice-president, became acting president. He was elected provisional president in 1909 and constitutional president in 1910, and was successful in extricating his country from the difficulties with foreign countries in which his predecessor had entangled her. Upon the expiration of his term of president he was re-elected, but preferred to take office as commander-in-chief of the army, Marquez Bustillos acting as provisional president. Charges of alleged pro-Germanism were made against him in London and in Washington in 1917.

GOMEZ DE AVELLANEDA Y ARTEAGA, Gertrudis, Spanish dramatist and poet: b. Puerto Principe, Cuba, 23 March 1814; d. Madrid, 2 Feb. 1873. She removed to Spain in 1836, where her first volume of poems was published with a complimentary preface by Gallego in 1841. She was married to Pedro Sabater of the diplomatic service in 1846, but was widowed in less than a year. In 1853 she made a second marriage with Col. Domingo Verdugo. Her poetry in a measure bridges the gap between the classic and romantic schools, and while opinions differ as to her rank among poets she stands unquestionably first among the

Spanish women poets of her century. Her dramas were highly successful, but her novels were of little importance, her fame resting upon her poetic and dramatic works. Gifted with a high poetic sensibility to beauty, tragedy and devotion she nevertheless lacks somewhat in the broader scope of human sympathies; and her constructive power is often unequal to sustained effort, although she reaches a high point of eloquence and dramatic power in many instances. Her novels include 'Sab' (1839); 'Dos mujeres' (1842); 'Espatolino' (1844); 'Guatimozin' (1846), etc. Among her dramas are 'Leoncia' (1840); 'Alfonso Munio' (1844); 'Saul' (1849); 'Baltasar' (1858), etc. In verse 'Poesias liricas' (1841; enlarged ed., 1850). Her 'Obras literarias' (5 vols., 1869–71) have not been completed.

GÓMEZ Y BAEZ, ē bä'ĕs, **Máximo**, Cuban soldier: b. Bani, Santo Domingo, 1831; d. Havana, Cuba, 17 June 1905. When Santo Domingo revolted against Spain he served as lieutenant of cavalry in the Spanish army; and when the freedom of the island was declared he went with the Spanish army to Cuba, but left the army because General Villar maltreated some Cuban refugees. In 1868 he joined the Cuban insurrection, and through his ability and daring soon rose to a position of prominence, being in several successful engagements. Though deprived of his command at one time, he was soon recalled, and rose to be major-general. On the failure of the rebellion, he left Cuba and settled on a farm in Santo Domingo. Returning to Cuba, he was influential in bringing about the insurrection of 1895–98, and was made commander-in-chief of the Cuban army. His policy was to avoid open engagements and to drive the Spaniards out by devastating the island and constant harassing of their troops. When the Americans landed in Cuba (1898) he willingly co-operated with them. On 24 Feb. 1899 he marched into Havana at the head of his soldiers and was received by the United States authorities. In March of the same year he was deposed from his command by the Cuban Assembly on account of his accepting $3,000,000 for his army from the United States. He assisted the American governor-general in his work in the island; was governor of the province of Santa Clara and a member of the Constitutional Convention; and he continued as governor under the presidency of Estrada Palma. He wrote 'Sanchito Gomez' and 'Mi Escolta' (1896), describing his campaigns in Cuba. Consult Carrillo, 'In the Saddle with Gomez' (New York 1898).

GÓMEZ-FARIAS, fä-rē'äs, **Valentín**, Mexican statesman: b. Guadalajara, 14 Feb. 1781; d. Mexico City, July 1858. He was appointed a professor in the University of Guadalajara in 1810, was a Liberal member of the first Constituent Congress, was elected Vice-President with Santa Anna, and in consequence of the latter's absence assumed executive powers 1 April 1833. In 1835 a constitutional congress refused to acknowledge his authority, and he was exiled. He returned in 1838; in 1840 led an unsuccessful revolt, and again was banished. Having returned in 1845, he was elected Vice-President in 1846; later a deputy to Congress, and was appointed Postmaster-General under Alvarez.

GOMME, Sir (George) Lawrence, English antiquary and folklorist: b. London, 1853; d. 24 Feb. 1916. He was educated at the city of London school and became statistical officer and clerk to the London common council. He was deeply interested in the rural customs of England, was founder, president and afterward vice-president of the Folklore Society, also acting as its secretary for some years. He was lecturer at the London School of Economics and University Extension, and editor of the *Antiquary*, the *Archæological Review* and the *Folklore Journal*. He was secretary to the lieutenancy of London and a Fellow of the Anthropological Institute. He wrote 'Primitive Folk-Moots' (1880); 'Chap-books and Folklore Tracts' (1885); 'Ethnology in Folklore' (1892); 'Governance of London' (1907); 'Folklore as an Historical Science' (1908); 'The Making of London, 1911' (1914), etc. He also edited 'The Gentleman's Magazine Library' (1883–1906); 'The King's Story-Book' (1897); 'The Queen's Story-Book' (1898); 'The Princes' Story Book' (1899); 'The Princess's Story-book' (1900); and several editions of historical novels.

GOMORRAH. See SODOM AND GOMORRAH.

GOMPERS, Samuel, American labor leader: b. London, England, 27 Jan. 1850. He came to America with his parents and other relatives in 1863 and became an American citizen at the age of 21. A cigarmaker by trade, he has been known as a zealous worker in the cause of the rights of labor since his boyhood. He was one of the founders of the American Federation of Labor in 1881 and has been associated with that organization in an official capacity ever since, with the exception of two years. In 1908 he was sentenced to a year's imprisonment on account of defying a court order in connection with the Bucks' stove case, which denied the constitutional rights of free speech and free press as well as involved the abuses of the writ of injunction which deprived men of trial by jury and substituted judicial government for constitutional government. The case was appealed to the Supreme Court of the United States, and on 15 May 1913, Justice Lamar delivered the judgment of the court as follows: «The judgment of the court of appeals is reversed and the case remanded with directions to reverse the judgment of the Supreme Court of the District of Columbia and remand the case to that court with direction that the contempt proceedings instituted by the Bucks Stove and Range Company be dismissed, but without prejudice to the power and right of the Supreme Court of the District of Columbia, to punish by a proper proceeding contempt, if any, committed against it.» Contempt proceedings were again instituted in the Supreme Court of the District of Columbia by Justice Wright, who again found Mr. Gompers guilty and imposed the same sentence. The case was again appealed to the Court of Appeals of the District of Columbia and to the Supreme Court of the United States. The Supreme Court dismissed the case because it was outlawed under the statute of limitations, but sustained the contentions of the American Federation of Labor that proceedings for contempt do not differ in essence from any ordinary charge of crime, and proceedings in contempt courts should be the same as the proceedings in the case of crimes.

Under the leadership of Mr. Gompers in 1906, the American Federation of Labor inaugurated a non-partisan political campaign to secure necessary legislation assuring to the wage earners lawful opportunity for activities necessary to protect the rights and to promote the interests and welfare of the working people. According to this campaign the wage earners used their political influence to secure the nomination and election of government representatives regardless of party, who pledged themselves and announced their approval of labor's demands. The result of this political policy has been a group in Congress known as the labor group, the members of which hold trade union cards and are affiliated with some labor organization. This group has gradually increased until the 64th Congress there was one senator and 17 members in the House of Representatives. As the result of this political activity labor's demands for fundamental rights were enacted into law in the labor provisions of the Clayton Anti-trust Act, which became a law 15 Oct. 1914. Section 6 of this act contains the declaratory statement that «the labor of a human being is not a commodity or article of commerce.» This declaration removes associations of wage earners from the provisions of trust legislation. Section 20 of the act limits and regulates the issuance of writs of injunction in conformity with the demands and contentions of the workers.

Under Mr. Gompers' direction the American Federation of Labor has become very powerful, and now includes every important union in the country. In politics, its hand has been seen indirectly in the enactment of the eight-hour day legislation in reference to all work on government contracts and in enterprises connected with public utilities, also employers' liability laws. Mr. Gompers has constantly and successfully combatted all tendencies toward Socialism in the labor movement and is an active promoter of industrial conciliation. See AMERICAN FEDERATION OF LABOR.

GOMPHOCERAS, genus of Palæozoic mollusks with exceptionally full and rounded shells which become narrower toward the opening. They are related to the *Orthoceras* and are possibly an ancestral forerunner of *Phragmoceras*. There are about 150 specimens known, occurring in rocks of the Ordovician and Silurian Age of Europe and North America. The Silurian basin of Bohemia is especially rich in them.

GOMPHOSIS, or **EUGOMPHOSIS**, joint formed by the immovable implantation of one part in a socket situated in another, as in the socketing of the teeth in the jaws, or the styloid process in the temporal bone. It is also designated as articulation by implantation.

GOMUTI, or **GOMUTO**, or **GUMUTI**, known also as **Areng**, **Ejoo** or **Ejú** and **Wine Palm** (*Arenga saccharifera*), sago-palm of Malacca and the Malays, commonly cultivated in India and growing wild in Burma and Assam. It is cultivated for a variety of products. reaches a growth of from 20 to 40 feet tall with leaves from 15 to 25 feet long. The tree dies after flowering and producing its fruit and when the sago product is desired it is cut before it flowers, usually at an age between 10 and 15 years. The first product is that of the black horsehair-like fibres, known as the ejú or gomuti fibre, which grow abundantly from the base of the leaves. The fibre is manufactured into cordage and is plaited for use as ornaments. It is not sufficiently pliable for running rigging but for other purposes is desirable because of its strength and imperviousness to the effects of water. The stiffer fibres are used as styles for writing on palm leaves; and within the sheaths is a woolly fibre, called bara, which is in demand in China for the caulking of boats, and is also used for filling cushions. The coarsest fibre is used for brushmaking and thatching, and sandals are manufactured from the leaf. The sap is obtained by cutting the flowers and from it is manufactured palm wine, spirits, sugar and vinegar. The tree also furnishes Java sago; which, while inferior to that of the true sago-palm, is an important addition to the food supply throughout the Malays. It is scarcely profitable for cultivation for its sugar, but the yield of sago is about 150 pounds per tree, and as 400 trees may be planted to the acre the yield is enormous. When the palm is permitted to flower and fruit it dies and the stem soon becomes hollow; and as the wood is remarkable for its lasting qualities when subjected to immersion in water it is much used for troughs and watering channels, lasting well even when placed underground.

GONAIVES, gō-nä-ēv', Haiti, town on the west coast on the bay of the same name, 65 miles north-northwest of Port au Prince. It has an excellent harbor, a naval and military hospital and a mineral spring. The exports are cotton, coffee, logwood, salt and mahogany. On 1 Jan. 1804 the independence of Haiti was proclaimed here by Dessalines, and in 1914 two battles were fought here between rebel and government forces. A United States consul is situated here. Pop. 15,500.

GONAS. See HOTTENTOTS.

GONÇALVES DIAZ, **Antonio**, Brazilian poet: b. near Caxias, Maranhão, 1823; d. at sea, September 1864. He studied law at the University of Coimbra, Portugal, but upon returning to Brazil in 1845 he engaged in literary pursuits at Rio de Janiero as a newspaper writer and poet. His first volume of poems, 'Primeiros Cantos' (1846), established his reputation as a poet, being remarkable both for their interpretation of Brazilian national feeling and as bearing the imprint of his own individuality. His 'Segundos Cantos e sextilhas de Frei Antão' (1848) confirmed his reputation for clear, beautiful expression and easy rhythm. He was appointed professor of Brazilian history at the Imperial College of Pedro II at Rio de Janiero in 1849 and in 1851 published his 'Ultimos Cantos' which practically concluded his contributions to poetry. In 1851–59 he was engaged in government service, studying educational institutions in northern Brazil and in Europe. Returning to Brazil in 1860 he was appointed to the expedition sent to make a historical and ethnographical survey of the province of Ceará. Illness compelled his resignation in 1862 and it was when he was returning from a trip to Europe, in which he sought to restore his health, that he perished in a shipwreck off the shores of Brazil. Besides the three volumes of verse already mentioned he was author of ‘Os Tymbiras’ (1857); ‘Diccionario da lingua Tupy’ (1858). He wrote many reports upon his government investigations and had written a considerable part of a work entitled ‘Historia des Jesuitas de America.’ A complete edition of his lyrical poems was published under his own direction at Leipzig and his complete works were published in Rio de Janeiro.

GONCHARÓF, gôn-chä-rôf', **Iván Aleksandrovitch**, Russian novelist: b. 18 June 1812, at Simbirsk, on the Volga River; d. Saint Petersburg, 27 Sept. 1891. His father was a member of the merchant class, but died at an early age, leaving the three-year-old boy in the charge of his mother, a woman of unusual character and ability. He was at first educated at home especially under the direction of his godfather, a former seafaring man who had retired from service and was an inmate of Goncharóf's household, where his general culture, his sense of humor and his inexhaustible fund of anecdotes and reminiscences of travel in all parts of the world made him the central figure in the best society of the prosperous provincial capital. The boy was in due time entered at a boarding-school attended by the sons of wealthy landed proprietors, and the principal teacher, a priest of a different type from the usual country clergyman, who had graduated from the Theological Seminary of Kazán, was a man of culture and breeding and was married to a French lady who taught her native language to the students. The school possessed an excellent library of Russian and foreign masterpieces — history, fiction, poetry and books of travel — some of which Goncharóf not only read but even learned by heart. At the age of 12 he was sent to Moscow where his passion for reading was still further stimulated and he made great progress in French, English and German. In 1831 he entered the Moscow University in the department of philology. Here he came under the influence of an unusually able corps of professors whose lectures on history, literature, archæology and art appealed to his best ability and confirmed him in his love for all that was lofty and beautiful. After finishing the full course he returned to his home for some months and then proceeded to Saint Petersburg where he entered the service of the Ministry of Finance as interpreter. He became acquainted with the brilliant circle of novelists, poets and journalists, the two Maĭkof brothers, Nekrásof, Byelinsky, Panáyef. He was thus drawn to literature and wrote his first novel ‘An Ordinary Story’ (Obuiknovánnya Istóriya), the first part of which appeared in *The Contemporary* (*Sovreménnik*) in 1847. He was already planning a new work and even went so far as to print some chapters of it under the title, ‘Oblomof's Dream,’ but in 1852 he accepted an offer from the Ministry of the Marine to accompany Admiral Putyátin as his secretary on a trip around the world with the aim of concluding a treaty with Japan. The result of this experience was given to the public in 1856 and 1857 in two large volumes entitled ‘Frigate Pallada.’ During his journey he worked desultorily on ‘Oblomof’ and after his return he went to Carlsbad and finished it in about a month and a half. It was printed in 1858 and 1859 in the *Annals of the Fatherland* and immediately created an immense sensation, the hero of the story being recognized as a very distinctive Russian type. His official duties and his social diversions largely interfered with his literary activities and he waited 10 years before he published his next and final masterpiece of fiction, ‘The Precipice’ (or ‘The Abyss’ — Obruif) which came out in the *European Messenger* (*Vyéstnik Yevrópui*) and in book-form in 1870. His collected works also comprise critical articles and translations.

NATHAN HASKELL DOLE.

GONCOURT, de, dė gôn-koor, EDMOND LOUIS ANTOINE HUOT: b. Nancy, 26 May 1822; d. 16 July 1896; and JULES ALFRED HUOT DE: b. Paris, 17 Dec. 1830; d. Auteuil, 20 June 1870; French novelists. The Goncourt brothers were not men of letters but artists primarily, and in 1849 they set out, knapsack on back, to traverse France for drawings and water-colors. Their notebooks made them writers as well as artists, and already in 1852 they had commenced that literary partnership which continued nearly 20 years. Their earliest serious works were a group of historical studies upon the second half of the 18th century, intended to be an effective resurrection of its habits of life, manners and costume, which, though elaborate in detail, lacked calm and impartial historical sense, breadth of view and creative grasp of character. These books were ‘Histoire de la Société Française pendant la Révolution’ (1854), ‘La Société Française pendant le Directoire’ (1855); ‘Portraits intimes du XVIII Siècle’ (1856–58); ‘Histoire de Marie Antoinette’ (1858); ‘Les Maîtresses de Louis XV’ (1860–79); ‘La Femme au XVIII Siècle’ (1862) and ‘L'Amour au XVIII Siècle’ (1877); ‘Gavarni’ (1873) and ‘L'Art au XVIII Siècle’ (1874). The more important work of the De Goncourt brothers was their novel writing; their conception of the novel was that it should be an imaginative attempt to grasp and summarize the results of close and minute observation; their aim was to paint manners by taking the traits in which one man resembles a class; hence they select as generic types only persons of moderate faculties. Their ‘Journal’ (1887–96) is a poignant and significant literary document, valuable for its information on the literature of the period. Their novels, descriptive not so much of passion as of manners, include ‘Les Hommes de Lettres’ (1860), republished in 1869 under the title, ‘Charles Demailly’; ‘Sœur Philomène’ (1861), describing the hospital life of a Sister of Charity; ‘Renée Mauperin’ (1864), a study of social life; ‘Germinie Lacerteux’ (1865), a character study of the gradual degradation of a domestic; ‘Manette Salomon’ (1867), in which an artist's model plays the part of human vampire; and ‘Madame Gervaisais’ (1869), a study of mysticism. After the death of his brother, Edmond wrote the ‘La fille Elisa’ (1878), a novel; ‘L'Œuvre de Watteau’ (1876), ‘L'Œuvre de Prudhon’ (1877); and ‘La Maison d'un Artiste’ (1881).

On his death, Edmond de Goncourt left the greater part of his fortune to found an academy — the Académie Goncourt — and the first members of which were nominated by him.

They receive each an income of 6,000 francs; but membership is forfeited on election to the French Academy. Consult Bellock and Shedlock, 'Edmond and Jules de Goncourt' (1895); Paul Bourget, 'Nouveaux Essais de Psychologie' (1885); Delzant, 'Les Goncourts' (1889); Wells, 'A Century of French Fiction' (1898).

GONDAR, or **GUENDAR,** Abyssinia, former capital of Amhara, about 21 miles northeast of Lake Tsana, and on a spur of the Wogara Mountains, 7,500 feet above sea-level. The town is in a more or less ruined condition, having suffered severly in the civil wars of Abyssinia and being ruthlessly damaged by Emperor Theodore II in 1868. It was a loosely built town of districts divided by open spaces and at the beginning of the 16th century was a small village. It became the capital of the kingdom by choice of Seged I. It was the seat of many churches, castles and palaces and was at its height in 1736 when the last of the palaces, that of Negus Yesu II was built. From that time until the British pacification of the Sudan in 1886–89 Gondar was repeatedly sacked and fired. The population dwindled from an estimated 50,000 in 1770 to about 7,000 in 1905. The ruins of the castles and palaces of Gondar show traces of the Portuguese population at one time numerous there, the buildings resembling in a measure the mediæval fortresses of Europe. The churches were built in the circular Abyssinian manner, but of the 44 which once existed in Gondar or its immediate vicinity but one remained without serious injury in 1900. The population is chiefly Mohammedan and there is a settlement of Falashas. With the pacification of the country the fortunes of the town have improved and with an increasing population there is now a trade between Gondar and the Blue Nile. The industries number those of gold and silver ornaments, cotton and cotton cloth, shoes, saddles and carvings in bone and ivory. Consult Powell-Cotton, 'A Sporting Trip Through Abyssinia' (1902).

GONDOKORO, or **ISMAILIA,** Uganda, trading-station and formerly a government post, on the east bank of the upper Nile, 1,070 miles south of Khartum by river and 350 miles northwest of Entebbe on Victoria Nyanza. It was first visited by Europeans in 1841–42 and was at one time an important slave-trading centre. A British military station was established there in 1871 but was abandoned by Gordon in 1874 because of the town's unhealthful situation. The Mahdists gained control of it in 1885, but the town was reoccupied by British troops in 1898. As the head of the navigation of the Nile Gondokoro is of considerable importance, the journey from there to Uganda being made overland, and it constitutes an outlet for the produce of that territory. An Austrian Roman Catholic mission was maintained there in 1851–59 and the town is of some prominence in the early explorations of Africa. It was named "Ismailia" in honor of the reigning khedive by Governor-General Baker at the time of his establishment of a military post there in 1871.

GONDOLA, a long, narrow boat used on the canals of Venice. The middle-sized gondolas are upward of 30 feet long and 4 to 5 feet broad; they always terminate at each end in a sharp point, which is raised perpendicularly to the ordinary height of a man. They have a well-furnished cabin amidship. They are propelled by rowing; the oarsman or gondolier stands in the stern facing forward; sometimes there are two gondoliers, the second one standing in the bow. They are usually painted black in accordance with an old law of the Venetian republic, which prescribed that all gondolas should be black, except those of the Doge and the foreign ambassadors. The gondolas were until recently the only means of getting about the city; now steam-launches, acting as omnibuses, are also used.

GONDS, an aboriginal race of British India, a remnant of the Dravidians who were driven out of the plains by an early Aryan invasion. They took refuge in Gondawana, a territory almost identical with what are now called the Central Provinces. Here their seat was the Satpura plateau, between the rivers Pain Ganga, Pranhita and Godavari on the west and the Indravati on the east, while they were bordered on the north by the river Nerbudda. They still retain their dominion in the mountain forests of Orissa. Gondrin dynasties reigned from the 14th to the 18th centuries, when they were subdued by the Mahrattas. Since 1781 they have become subjects of England, and their speech and religion have more and more conformed to those of the Hindu. Their language, known as Gondi, is a Dravidic branch of the Dekhan language. Their occupational groups are endogamous; bards, soothsayers, iron-workers, dancers and prostitutes, etc., forming practically separate castes. Their religion is animistic: ancestors are deified. Their religion consists in a worship of many spirits and they are enslaved to their priests. They have distinct physical characteristics which differentiate them from the Hindus. They are small in stature, well-proportioned, swarthy, almost black in complexion; their hair is long and black, though sometimes it is of a ruddy tinge. In countenance they have a broad forehead and small, deep-set eyes. They wear little clothing. One of their clans, the Moria, tattoo their faces and shave their heads. Their total numbers over 2,500,000. Consult Forsyth, 'Highlands of Central India' (1889); Dalton, 'Descriptive Ethnology of Bengal' (1872); Risley, 'Tribes and Castes of Bengal' (1892); Holderness, 'Peoples and Problems of India' (1912); and the article "Gondwāna" in Hunter's 'Imperial Gazetteer of India' (1908).

GONFALON, an ensign or standard which used to be borne by the chief magistrates of many Italian cities, as Florence and Lucca. These magistrates were hence called gonfaloniers. The title of gonfalonier was also sometimes bestowed by the Roman Catholic Church on persons of distinction, who were called gonfaloniers of the Church.

GONG, an instrument of Chinese origin, made of a mixture of metals and shaped into a basin-like form, flat and large, with a rim a few inches deep. The sound of the gong is produced by striking it, while hung by the rim, with a mallet, which puts the metal into a state of vibration and produces a loud piercing sound. The modern gong or gong-bell is sounded by striking it with a hammer operated by machinery.

GÓNGORA, Luis de Góngora y Argote, gōn'gō-rä ē är-gō'tä gōn'gō-rä, Spanish lyric poet: b. Cordova, 11 July 1561; d. there, 24 May 1627. About 1614 he entered the Church and became a prebendary of the cathedral at Cordova, and eventually chaplain to Philip III. Góngora's earlier writings — sonnets on a great variety of subjects, lyrical poems, odes, ballads and songs for the guitar — are inspired with much true poetic feeling. His later works, consisting for the most part of longer poems, such as 'Solidades' (or Solitary Musings), 'Polifemo,' 'Pyramo y Thisbe,' are executed in an entirely different and novel style, characterized especially in respect of diction, by some of the same distinctive features as are found in Euphuism in England and Chiabrerism in Italy. This later style of Góngora, which his followers and imitators designated the *stilo culto,* is florid, pedantic, full of Latin inversions and mythological allusions, pompous and mannered, and in many places very obscure. He became the founder of a school, the Góngoristas or Culturanos, who were, if possible, more absurdly euphuistic than their master. His works were never published during his lifetime. The first edition was printed by his friend, Vicuña, in 1627. Consult Churton, 'Góngora' (1862).

GONIATITES, go"nĭ-ạ-tī'tēz, a genus of ammonites (q.v.), including the earliest forms characterized by the structure of the septa, which are lobed, but without lateral denticulations, as in the higher ammonites; they consequently exhibit, in a section, a continuous undulating line. Some forms with slightly waved septa approach very near to the Nautilus. The siphonal portion is shorter than the sides, forming a sinus at the back, as in the Nautilus. The last chamber, the one tenanted by the animal, occupies a whole whorl, and has besides a considerable lateral expansion. The shells are small, seldom exceeding six inches in diameter. This genus is confined to the Palæozoic strata, especially the Upper Devonian and Lower Carboniferous.

GONIOCERAS, mollusk of the order of nautiloid cephalopods, marked for its widely variant forms but in the main of triangular shape, somewhat flattened (*Gonioceras anceps*). It occurs in the Ordovician limestones of New York State and Canada and also in the extreme northern parts of North America and China.

GONIOMETER, a device for measuring the angles of crystals. The application goniometer may be likened to a protractor with a rotary radius. It is a semi-circle hinged at 90 degrees, to which are attached two arms of steel which are directly applied to the crystal whose angles are to be measured. Far more accurate is the reflecting goniometer, consisting of a graduated circle mounted either vertically or horizontally upon a stand with an apparatus for adjusting the crystal, and one or two telescopes; it determines through what angular space the crystal must be turned that two rays of light reflected in turn from two surfaces shall have the same direction.

GONIOPHOLIS, a primitive crocodile of the Jurassic Period. It is distinguished from modern crocodiles by several features, especially by the bi-concave vertebræ and the arrangement of the bony plates on the back. It once inhabited the Jurassic swamps and river-deltas in Europe and America, along with dinosaurs, turtles, etc. A complete skeleton is now exhibited in the Brussels Museum.

GONORRHEA is perhaps the most universal and widespread of all diseases that affect the human race. Competent authorities have computed that fully three-fourths of the adult male population and from one-sixth to one-third of the adult female population have contracted this disorder. The great majority of women who have gonorrhea are reputable married women who have been infected by their husbands. Material as well as moral and sanitary conditions modify venereal morbidity. It is much greater in large centres of population than in suburban and rural communities.

Definition.— Gonorrhea may be defined as a specific inflammation peculiar to certain mucous membranes, attended with the production of a purulent discharge. This discharge has the property of exciting a similar inflammation when brought in contact with other mucous surfaces susceptible to its action. The urethral mucous membrane in the male and the mucous membrane of the urethra, vagina and cervix in the female are ordinarily the seat of gonorrheal inflammation. Almost all mucous surfaces of the body, particularly the conjunctival mucous membranes, are susceptible to the irritant action of gonorrheal pus.

Cause.— The cause of gonorrhea is a specific micro-organism termed the gonococcus, which was discovered by Neisser in 1879. Inflammation of the urethra may result from a multiplicity of causes, chemical, irritant and others, but true gonorrheal inflammation has as its unique etiological factor the gonococcus.

The Gonococcus.— This micro-organism is a diplococcus; in shape each individual of a pair resembles a coffee bean — flat or slightly concave on one side and rounded on the other, with their flat surfaces opposed. The two hemispheres are separated by such a narrow interval that it is only recognizable under a lens of high power. The diplococci are grouped in pairs, fours and other multiples of two. Their growth occurs by fissure, at right angles to the central interspace. The gonococci are always grouped in irregularly shaped columns and are never met with in chains or pairs, as certain other micro-organisms. The differential characteristic of the gonococci is, that they quickly take a stain of aniline dyes and are more rapidly bleached than other micro-organisms. They may occur both within and without the pus and epithelial cells. In acute cases they are very numerous, but have a tendency to grow fewer with the decline of the inflammatory process. They are characterized by a marked longevity, are susceptible of existing in a latent state for an indefinite period and are capable of being revived and exalted in virulence by local irritation which causes congestion of the parts, or when transferred to virgin tissues in which they find conditions favorable for their germination and growth. Numerous cases are on record where the gonococcus has been found still conserving all its virulence and susceptible of being provoked into new activity by a variety of irritant causes years after infection.

Within the past two or three decades our knowledge of gonorrhea has undergone most marked and revolutionary changes. The old conception of gonorrhea was that of a purely local disease, confined to the mucous tract in which it had its habitual origin, trivial in character, of limited duration and entailing no serious consequences to the individual, except from neglected complications. The occasional occurrence of rheumatism or of ophthalmia, which was recognized by the older observers, was thought to be due to the development of a latent rheumatic diathesis, to sympathetic inflammation or simple metastasis. The idiosyncrasy of the patient was thought to play an important rôle in their production.

Since the discovery of the gonococcus, new facts have been developed, showing that instead of being limited to the genito-urinary tract, the range of its morbid action is much more extensive and not infrequently is radiated to important internal organs. As a result of modern investigations it may be positively affirmed that the gonococcus is susceptible of being taken up by the blood vessels and lymphatics, and that it may affect almost every organ of the body. Staining and culture experiments have demonstrated its presence not only in the ovaries, tubes and peritoneal cavity, which it reaches through invasion of the intermediate mucous membrane, but also in the lining membrane of the brain and cord, of the heart, of the pleura, liver, spleen, kidneys, as well as the joints and tendinous sheaths.

The number, variety and gravity of these systemic manifestations has led to the serious consideration of the question whether gonorrhea is not to be classed as a constitutional affection. The cause or relation between these systemic affections and the gonococcus has been proved by the identification of the gonococcus in the lesions it has produced. These general effects have been also ascribed not simply to the pathogenetic action of the gonococci, but to their toxins and the presence of certain pyogenic microbes associated with the gonococcus.

Complications.— The more common complications of gonorrhea are acute and chronic inflammation of the postate and bladder and seminal ducts and vesicles, the cord and testes.

Gonorrheal Arthritis.— One of the most important complications of gonorrhea is seen in certain joint-affections, which are usually described under the term of gonorrheal rheumatism. This complication usually occurs from the second to the third week of the disease, but may develop as early as the fifth or sixth day. Gonorrheal arthritis manifests a remarkable affinity for the large articulations, as the knee and ankle joints, the hip and elbow. Only one joint may be involved, constituting what is termed mono-articular arthritis, or a number of joints may be involved, constituting poly-articular arthritis. In the latter case, different joints are more likely to be involved in succession, rather than simultaneously. As a result of the inflammation of the synovial membrane, which is particularly involved, there often occur serous, fibrinous or purulent effusions. It is essentially a hydrarthrosis, and in most instances the disease is confined to the synovial membrane of the joint during the whole course of the affection. Gonorrheal arthritis is usually chronic in duration, often lasting from two to three or for many months. In some cases it is chronic and practically indefinite. Anchylosis or immobility of the joint from rapid formation of adhesions is a not infrequent termination. Very often the tendinous sheaths, the bursæ and fascia may be involved.

Unfortunately the treatment of gonorrheal rheumatism is extremely unsatisfactory. It does not seem to be susceptible to the curative action of remedies which are valuable in attacks of ordinary rheumatism. In quite a large proportion of cases there is more or less deformity or permanent disability.

Gonorrheal Ophthalmia.— There is usually recognized a distinction between an ophthalmia which is due to a septic absorption, like gonorrheal rheumatism, and that form of purulent conjunctivitis which is caused by direct transference of pus containing gonococci to the eye. The former never results from the direct inoculation of the contagious matter. Its symptoms are milder, and there are rarely changes which occasion adhesions or permanent injury to the sight. On the contrary, purulent conjunctivitis is due to the inoculation of the mucous membrane of the conjunctiva. The inflammatory process is characterized by greater intensity and rapidity of action, and not infrequently results in partial or complete loss of vision. Unless prompt and efficient treatment be at once instituted the cornea may rapidly ulcerate and slough, and prolapse of the contents of the globe of the eye may occur through the perforation. These changes are sometimes almost incredibly rapid, taking place in three or four days, exceptionally in 24 hours, and leading to complete destruction of vision. In the ophthalmia of the new-born, the eyes of the child are liable to be soiled with the uterine and vaginal liquids containing gonococci — one of the most frequent causes of blindness. It is estimated that from 10 to 20 per cent of all blindness is caused by gonococcic infection.

Gonorrhea in Women.— Our knowledge of gonorrhea in women is essentially a modern acquisition. Until within recent years it had never been the subject of serious and careful study. In the female the local and general effects of gonorrhea are apt to be much more serious and permanent, owing to the extent and character of the structures exposed to infection. The greater extent of the genital tract permits a larger field for infection by direct continuity of tissue. The periodic vascular changes incident to the menstrual period, and the more pronounced modifications caused by pregnancy, exert a marked influence in accentuating the gravity of gonorrhea in women. As a result of these changes gonococci, invading the uterine cavity and ascending along the tubes and ovaries to the peritoneal covering, produce peritonitis. Not only do these inflammatory changes imperil the life and health of the woman (which danger, in many instances, can only be averted by an operation involving the sacrifice of her reproductive organs), but they may absolutely extinguish her hope of children. Gonorrhea is one of the most prolific causes of sterility. The inflammatory changes result in the blocking up of the channels of communication between the ovaries and the uterine receptacle of the ovum, thus preventing contact with the germinative spermatozoids. This mechanical obstacle to the passage of the ovum is, as a rule, permanent and irrelievable. It thus happens that the aptitude of the gonorrheic woman for conception is often extinguished by the first pregnancy, the first child representing the sum total of her productive energy. In this connection, it may be said that one of the complications of gonorrhea affecting the male (epididymitis) is a very frequent cause of sterility in men. Neisser believes that gonorrhea in the male is responsible for 45 per cent of sterile marriages. The proportion of sterility due to the husband is variously estimated from 17 to 25 per cent, and almost the entire proportion of sterility in women is due to gonorrhea communicated to her by her husband. The low birth-rate of married women is not, as is generally supposed, always voluntary, but it often proceeds from physical causes relating to the health or productive capacity of the married parties; it is not from choice, but from incapacity.

Gonorrhea as a Social Danger.— Owing to its great frequency, the persistent vitality and virulence of its germs, even after apparent cure, and especially to the grave nature of the infection in women, and the serious menace to the health and even the life of the victim — to say nothing of its destructive effects upon the procreative functions — gonorrhea is now regarded by the medical profession as one of the most formidable social plagues of our age. Every year in this country thousands of young, innocent women are infected by their husbands, who in most cases are not aware that they carry with them the germs of a disease destined to wreck the health or lives of their partners. Many such women drag out a miserable existence of semi-invalidism, subject to painful or difficult menstruation, no longer able to walk freely, condemned to pass their days of suffering in a reclining position; and after years, it may be, of this suffering, worn out and desperate, they apply to the surgeon, who, at the price of the sacrifice of their generative organs, renders their existence possible in making them castrated women.

GONSALVO DE CORDOVA, gōn-sāl'vō dė kŏr'dō-vä (Sp. gōn-thä'lō dā kŏr'dō-bā), in full Gonsalvo Hernandez de Cordova y Aguilar, Spanish warrior: b. Montilla, near Cordova, 1453; d. Granada, 2 Dec. 1515. At the court of Ferdinand and Isabella, Gonsalvo attracted much attention by his personal beauty, his knightly skill and the magnificence of his apparel and style of living. In the war with Granada, 1481–92, he took many places by storm and vanquished the boldest Moors who dared to meet him in single combat. He was selected to carry on the difficult and dangerous negotiations with the Moorish king Abu Abdallah (or Boabdil), which resulted in the capitulation of Granada and the termination of Moorish rule in Spain. He helped Ferdinand II, king of Naples, to drive the French over the Neapolitan frontiers, and in 1500 delivered Zante and Cephalonia from the Turks and restored them to Venice. In the war between France and Spain, for the sovereignty of Naples, Gonsalvo gained successive victories, until by the fall of Gaëta, the French were forced to yield their claim upon Naples. Ferdinand now bestowed upon him the duchy of Sessa, and appointed him viceroy of Naples, with unlimited powers, which post he held until 1507, when the jealousy of the king caused his removal.

GONVILLE AND CAIUS (kēz) **COLLEGE,** a college of Cambridge University, England, was founded in 1348 by Edmund Gonville of Terrington, Norfolk, and endowed for a master and three fellows. The original site was between Free School Lane and the churchyard of Saint Botolph's. In 1353 William Bateman, bishop of Norwich, Gonville's executor, established the college where the Gonville Court at present stands, and altered the name to the Hall of the Annunciation of Blessed Mary the Virgin. In 1557 Dr. Caius obtained the royal charter by which all the former foundations were confirmed and his own foundation was established. By this charter the college was thenceforth to be called Gonville and Caius College. New statutes were given by which the college is henceforth to consist of a master, 30 fellows and 36 scholars. The fellowships are all open, and are not vacated by marriage, but terminate generally at the end of 10 years from the full standing of M.A. The scholarships are also open. There are also connected with this college four studentships of medicine founded by Charles Tancred, and two Harrow scholarships. Sir Thomas Gresham, Judge Jeffreys, Jeremy Taylor and Lord Chancellor Thurlow were connected with this college. Consult Venn, 'Caius College' (1901).

GONZAGA, gōn-zä'gā, **Thomaz Antonio,** Brazilian poet; called the Portuguese Anacreon: b. Oporto, August 1744; d. Mozambique, 1809. After studying law in the University of Coimbra, Portugal, he returned in 1768 to Brazil to enter on an official career, where he eventually became judge at Villo Rica in the province of Minas. In 1788 he was about to marry Maria de Seixas, a young lady of distinguished beauty, when he became involved in a political conspiracy. The court condemned him to perpetual exile on an island on the coast of eastern Africa, which by special favor it was commuted to 10 years' banishment to Mozambique. He left Brazil in 1793, and was attacked by fever soon after reaching Africa, from which he recovered only to fall into madness from the effect of the climate. The most interesting of his poems were composed during his captivity, and celebrate in mournful and tender verse the object of his love under the name of Marilia. These are the finest collection of erotic verse written in Portuguese to one person. They are popular alike in Brazil and Portugal, and have been often reprinted. In grace, tenderness, purity of style and harmony of verse, Gonzaga ranks among the first Portuguese poets.

GONZAGA FAMILY, a noted Italian family which held the supremacy in Mantua 1328–1707. On 14 Aug. 1328 Ludovico (or Luigi Gonzaga) assumed the sovereignty after his sons had driven out the Bonacorsi family and taken possession of Mantua. He died 1360, aged 93. Among his descendants, Gian Francesco Gonzaga, in 1432, obtained possession of the city, with its territory, under the title of marquisate, as a fief from the Emperor Sigismund. Gugliemo (1550–87) and Vicenzo (1587–

1612), both rulers of note, were patrons of the Tasso family, the father of the poet having been secretary to the former. Among the noted scholastics of the family was Luigi Gonzaga (1568–91), a Jesuit who, canonized as Saint Aloysius, became the patron saint of students. With Vincenzo II, the reigning line became extinct in 1627. The next heir would have been the Duke of Nevers, but the Duke of Guastalla, Ferdinand II, one degree more remote, laid claim to the whole inheritance, and Charles Emanuel, Duke of Savoy, claimed Montferrat. It was evident that the house of Nevers had a legal right, and France, Venice and the Pope supported him. Spain and Austria, on the other hand, supported the groundless claims of the Duke of Savoy, whence arose a war concerning the Mantuan succession, which ended with the triumph of Charles, Duke of Nevers. His grandson, Charles III, succeeded him in 1637, and during his reign the principality obtained full independence. He died in 1665. Many persons of his family have obtained military renown. Others have been conspicuous for their love of the arts and sciences. Cæsar, in 1565, erected the academy Degl'invaghiti; and others of the family founded galleries of paintings and antiquities. Giulio Romano, under their patronage, established an extensive school for painting, and many celebrated artists received from them support and honor. Consult Hare, C., 'A Princess of the Reformation' (New York 1912); Solari, E., 'Ercole Gonzaga' (Venice 1904); Symonds, 'The Renaissance in Italy' (London 1898).

GONZÁLES, gôn-sä'lĕs, **Count Fernán**, a half mythical, half historical character who figures prominently in the literature of the early days of the conflict between Moor and Christian in Spain, d. 970. Legend makes him the hero of many battles and credits him with playing a prominent part in the recovery of Castile from Moorish control. He first came into prominence at the battle of Osuma (934); and his activities were confined to the northern part of Spain. A long poem in praise of Fernán González still survives. It covers the period between the first incursion of Spain by the Goths and the year of the battle of Moret (967). This poem, which in general is prosy, affords little that is not told elsewhere. It seems to be a poetical copy of the 'General Chronicle' of Alfonso the Wise, and to have been intended for public recitation. Many of the incidents of the heroic struggle between Christian and Mohammedan are spiritedly told, and the form of the poem and its simplicity are well calculated to interest the age for which it was written. It is undoubtedly one of the many imitations of the 'Book of Apollonius' (q.v.) and the popular poems of Berceo. In fact the opening of this chronicle of the doings of Fernán González consists of an invocation copied from Berceo's 'San Domingo de Solis.' But the imitation, in general, is one of style, division and handling of subject and employment of the rhyme form common to the 'Apollonius' and Berceo.

GONZALES, Manuel, Mexican soldier and statesman: b. near Matamoros, 18 June 1833; d. Mexico City, 8 May 1893. He entered the army in 1839 and fought under Juárez in 1861. In the war against the French he joined Escobedo in 1865 and was made a brigadier-general and governor of the legislative palace. Later he joined the party of Diaz and took an important part in the battle of Tecoae (1876) which gave Diaz the upper hand in Mexico and made him President. He was Secretary of War under Diaz, 1877–80, and followed him as President of the Mexican Republic, 1880–84. After his retirement he was governor of Guanajuato.

GONZALO DE BERCEO, gôn-thä'lō dā bār-thā'ō, who flourished during the first half of the 13th century, was a secular priest of San Millan Monastery, Spain, and an innovator in Spanish poetry. Little is definitely known of his life; but from internal evidence in his works, he probably died about 1260 at an advanced age. His writings are all of a religious character and breathe the spirit of faith and simplicity of his age. Berceo, as he was popularly known from the place of his birth, considerably improved the written Spanish of his day, but his work lacks the power, movement and vivacity of the Cid. Berceo's innovation in Spanish literature consisted in the use of what he called the "quaderna via," a succession of four lines rhyming with one another. This was a peculiarity which attracted attention at a time when the Spanish language was just beginning to graft rhyme on to its alliterative verse. It caught the public fancy to such an extent that there followed a deluge of rhyme, which was often far from being wisely or artistically used. However, on the whole, the introduction of Berceo was of decided advantage to Spanish poetry; and his rhyming system was not only imitated, but continued to retain its popularity for more than two centuries. The works of Berceo, which are of considerable extent, consist of poetical lives of San Millan, San Domingo de Silps, and Santa Orita of the 'Martyrdom of San Larenzo,' 'Signs Preceding the Last Judgment,' various poems on the Madonna, including the 'Miracles of the Virgin' and the 'Madonna at the Cross,' hymns and poems on the mass. Nearly all of this work is written in the four-line interrhyming stanzas introduced into Spanish literature by Berceo. The popularity of the subjects treated in a religious age and the novelty of the rhyme raised up for Berceo a school of imitators many of whom carried the repetition of rhymes to a wearisome excess. Berceo probably borrowed his system of rhyme from Apollonius of Tyre, though similar rhymes had been used, sparingly, however, by the troubadours, as early as 1100. It seems probable, therefore, that it may have come into Spain from Provence. Berceo was the first to give it a permanent place in Spanish literature in 1230, where it still survived at the end of the 14th century. Though of no great reach of imagination Berceo, by the carefulness of his rhymes, the beauty of his versification and the general harmony of his language at such an early age in the history of the Spanish tongue, has placed the literature of his country under deep obligation to him. He expresses the spirit that inspired him, in 'The Life of Santo Domingo,' which is the opening poem of his published works, when he says: "I intend to tell a story in the plain Romance, in which the common man is accustomed to converse with his neighbors." This choice of the vernacular was fortunate for the popularity of Berceo, and doubly fortunate for the popular speech which had already began to show its possibilities. Consult Ticknor, G., ‘History of Spanish Literature’ (New York 1854); Wolf, F., ‘Ueber die Lais’ (Wien 1841); or any good work on Spanish literature.

John Hubert Cornyn.

GOOBER, or **GOUBER.** See Peanut.

GOOCH, Sir **Daniel,** English engineer: b. Bedlington, England, 24 Aug. 1816; d. Clewer Park, Berkshire, 15 Oct. 1889. Besides inventing various improvements in the building of locomotives, he was active in furthering the laying of the first transatlantic cable, on the completion of which he was created a baronet. He sat in Parliament 1865–85. He was one of the superintendents of the Great Western Railway 1837–64, and chairman of the company from 1865 until his death.

GOOCH, Frank Austin, American chemist: b. Watertown, Mass., 2 May 1852. He was educated at Harvard and was assistant in the chemical laboratory there, 1872–75. He was subsequently chemist on the Northern Transcontinental Survey and United States Geological Survey, 1878–86, and has been professor of chemistry at Yale from 1886. His publications include ‘Analyses of Waters of the Yellowstone Park,’ with J. E. Whitfield (1888); ‘Research Papers from the Kent Chemical Laboratory of Yale University’ (2 vols., 1901); ‘Outlines of Inorganic Chemistry,’ with C. F. Walker (1905); ‘Laboratory Experiments with C. F. Walker’ (1905); ‘Outlines of Qualitative Chemical Analysis,’ with P. E. Browning (1906); ‘Methods in Chemical Analysis’ (1912); ‘Representative Procedures in Quantitative Chemical Analysis’ (1915). He also contributed to Rumpelly's ‘Mining Industries of the United States’ (10th census, 1886), and to ‘Explorations in Turkestan’ (Carnegie Institution Report 1908); and research papers to the *American Journal of Science,* the *Zeitschift Anorganische Chemie* and other journals.

GOOCH, Sir **William,** English colonial administrator: b. Yarmouth, 21 Oct. 1681; d. London, 17 Dec. 1751. He was a soldier of Marlborough in the Netherlands, and was governor of Virginia from 1727 to 1747. In 1740 he accompanied Vernon's expedition against Cartagena, and in 1749, after a generally excellent and successful administration, returned to England and was created a baronet. During his term of office he opposed religious toleration to religious organizations other than the Establishment.

GOOD, James Isaac, American (German) Reformed clergyman: b. York, Pa., 31 Dec. 1850. He was graduated from Lafayette College, Easton, Pa., in 1872; entered the Reformed ministry and has been successively pastor of Heidelberg Reformed Church, York, Pa., 1875–77; Heidelberg Reformed Church, Philadelphia, 1877–90, and Calvary Reformed Church, Reading, Pa., 1890–93. From 1893 to 1907 he was professor of dogmatics at Ursinus College, and professor of liturgics in Central Theological Seminary. Dayton, Ohio, since 1907. He has published ‘Origin of the Reformed Church of Germany’ (1887); ‘History of the Reformed Church of Germany’ (1894); ‘Rambles Round Reformed Lands’ (1889); ‘History of the Reformed Church in the United States’ (1899); ‘History of the Reformed Church in the United States in the Nineteenth Century’ (1911); ‘History of the Reformed Church of Switzerland since the Reformation’ (1913); also ‘Famous Women of the Reformed Church’ (1901); ‘Famous Missionaries of the Reformed Church’ (1903); ‘Famous Places of the Reformed Churches’ (1910); ‘The Heidelberg Catechism in its Newest Light’ (1914).

GOOD, John Mason, English physician and author: b. Epping, Essex, 25 May 1764; d. Shepperton, Middlesex, 2 Jan. 1827. In 1793 he removed to London, where he carried on business for several years as a surgeon and apothecary, and after 1820 practised as a physician. His principal works are ‘Memoirs of the Life and Writings of Dr. Alexander Geddes’ (1803); translations of Solomon's Song and the Book of Job; a translation of Lucretius ‘On the Nature of Things’ (1805); ‘Medical Technology’ (1810); ‘A Physiological System of Nosology’ (1817); ‘The Study of Medicine’ (1822), and ‘The Book of Nature’ (1826).

GOOD COUSINS, the name by which the members of the Carbonari Society were known among themselves in Germany and France. The society of the charcoal-burners (Carbonari) is undoubtedly one of the oldest in Europe. Some writers on the subject have claimed that its originator was Philip of Macedon, father of Alexander the Great, while others trace its origin to the union of charcoal-burners in Germany in the 12th century for self-protection against soldiers, robbers and other enemies. By the 16th century the secret society of the charcoal-burners was strong enough to force Ulrich, Duke of Württemberg, to abolish certain oppressive forest laws. These societies, which, in their mystical rituals, exhibited a curious mingling of Christianity and paganism, spread rapidly throughout the wide forest areas of Germany, France and adjacent countries, where their secrecy and their faithfulness to the obligations of their secret society oath became the highest symbol of faithfulness. In Italy, it was customary to affirm anything strongly by asserting that the statement or promise was made “on the faith of a Carbonaro.” Political plotters in various countries took refuge in the forest, and there, to disarm suspicion, assumed the rôle and life of charcoal burners and venders. This enabled them to go into the cities and towns and the strongholds of their enemies and there to spy out the land and meet with other plotters. Thus the Carbonari frequently played their part in the troublesome politics of Europe, extending their sway and their methods as far as Ireland and Scotland; and everywhere the Carbonari were known to one another by an elaborate series of ritualistic signs, international in their import and interpretation. This ritualistic organization seems to have been the result of the combination of the wood-cutters and charcoal-burners societies upon which was grafted a ritual formed, in part at least, by the political refugees and plotters, who succeeded in giving the association a world-wide importance, mystic significance and executive organization it could scarcely otherwise have had. Francis I of France plays a prominent part in the traditions of the Carbonari, at whose feasts the grand master of the order drinks his health, as its founder. The tradition runs that the king, while out hunting, got lost in the forest. There he was entertained by the charcoal burners and initiated into their secret order, in which he afterward took a great interest, elaborating the ritual into which he introduced a deep symbolism. In this tradition there is probably a shadowy remembrance of the fact that Francis I extended his protection to the Waldenses, many of them forest people, who had taken refuge in his kingdom. One of the traditional leaders of the Carbonari (who seems to have been a historical character) was Theobald, a hermit of noble rank who lived in the forest of Suabia; and he is said to have become the patron (during his life) and adviser of the charcoal-burners. He was canonized by Pope Alexander III in the 12th century and adopted by the Carbonari as their patron saint. The deeds attributed to him are a curious commingling of pagan and Christian traditions which are reflected in the ritualistic hymns which the Carbonari address to him, invoking his aid as the chief good cousin of all the «Good Cousins.» This ritualistic term which has long been employed by the members of the Carbonari to designate one another seems to have been first employed by the wood-cutters of the department of Jura (France) who termed their secret society «le bon coucinage» (the good cousinship), a name adopted by the Carbonari and applied also to the individual members of the association, the first and second degrees of which were termed, respectively, that of the Fendeurs (wood-cutters), and that of the Carbonari (coal-burners). In the pre-revolutionary days of France (1770–89) many of the members of the French Chambers and of other associations tinged with Republicanism were members of the Fendeurs, of which there were secret societies in most of the great centres of population in France, including the capitol itself. The Good Cousins societies, which afterward became too strong in southern Italy, were introduced into that country by returning soldiers who had taken part in the Napoleonic wars, or by exiles who had lived in Germany and Switzerland during the occupation of Italy by the French. The lodge or meeting-house of the Carbonari was known as the vendita; and the decrees of the society were popularly represented as those of the vendita. The first lodge or vendita of the Carbonari in Italy, of a formal character, was opened in Capua under the protection and auspices of the British, who wished to use the association as a means of uniting the Italians, in secret societies, against Napoleon. The order, thus encouraged, spread rapidly, became much better organized and played a prominent part in the political wars and revolutionary movements of Italy. See CARBONARI.

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JOHN HUBERT CORNYN.

GOOD FRIDAY (God's Friday), the name applied by the Church of England to the Friday before Easter, sacred as commemorating the crucifixion of our Lord; the Great and Holy Parasceve is the Greek title of it, and it is called in the Roman Missal the Parasceve. This day was kept as a day of mourning, of rigid fast and of special prayer from a very early period. Eusebius (260 A.D.) says that the day had been observed long before his time. Constantine ordered a cessation from all labor on that day. It was one of the two paschal days celebrated by the Christian Church, and in memory of the crucifixion was called by the Greeks Pascha Staurosimon or the «Pasch of the Cross.» In the Roman Catholic Church the service of this day consists of what is called the Mass of the Presanctified, the sacred host not being consecrated on Good Friday, but reserved from the preceding day. Communion is forbidden on Good Friday, except in the case of the celebrant and of sick persons.

The most striking part of the ceremonial is the «adoration of the cross,» or, as it was called in the Old English popular vocabulary, «creeping to the cross.» The black covering is removed from a large crucifix which is placed before the altar, and the entire congregation, commencing with the celebrant priest and his ministers, approach, and on their knees reverently kiss the figure of our crucified Lord. The very striking office of *Tenebræ* (darkness) is performed on Good Friday, as well as on the preceding two days: it consists of the matins and lauds of the following day, and has this peculiarity, that by the close all the lights in the church have been gradually extinguished except one, which for a time (as a symbol of our Lord's death and burial) is hidden at the Epistle corner of the altar.

In the Church of England, and in the Protestant Episcopal Church of the United States, as well as in the Roman Catholic Church, Good Friday is celebrated with special solemnity: proper psalms are appointed, and one of the three special collects is a prayer for «all Jews, Turks, infidels and heretics.» In some churches of the English Church, and of the Protestant Episcopal Church, the *improperia*, or reproaches, adopted from the Roman service, are sung; and Bach's passion music is frequently heard. The 'Three Hours' Devotion,' borrowed from Roman usage, with meditation on the 'seven last words' from the Cross, and held from 12 till 3, when our Lord hung on the Cross, is a service of Good Friday that meets with increasing acceptance among the Anglicans. In England and Ireland Good Friday is by law a *dies non*, and all business is suspended; but this is not the case in Scotland or the United States. In Scotland the day till recently met with no peculiar attention, except from members of the Episcopal and Roman Catholic communions; but of late years services have been held in many Presbyterian churches, and there is a growing disposition to fall in with the rest of Christendom in the observance of this day.

GOOD HOPE, Cape of. See Cape of Good Hope.

GOOD ROADS MOVEMENT, The. The country road is coming into its own in the recent and current "good roads movement." The importance of the rural highways of the nation has been long neglected, in comparison especially with the railroad. Canals and waterways — the other great natural means of transportation — have been likewise neglected. The American attitude toward transportation thus practically reverses the European way of regarding the problems; for in the leading continental countries, the highways and waterways are the principal means of transport and are regarded as such. This is due to the conditions of our national development, and the time now seems ripe for a continued interest in the completion of a highway system, and a renewed interest in canals, in order to supplement and render adequate to its special function the vast system of railroads that has been created.

In the first beginnings of our westward expansion roads occupied an important place, but for a while, in the early decades of the last century, were superseded by canals and waterways, as the principal trunk lines of transportation to the opening West. However, the outstanding fact that the river systems were separated by important geographic features, together with the need for more direct and rapid transit, made road-building still important. The "railroad" coming into practice about 1830 was really but a greatly modified road, and a supplement to the existing waterway system. But from its beginning it came rapidly to supersede all other means of long-distance transport, and has continued its growth and importance in the focus of interest, to the present. The decline of the waterways was very rapid and almost complete, until the very recent awakening of interest in them, as one phase of the conservation of national resources (1908). Roads became a merely local matter — mere feeders for the greatly growing railroad system — the decline of local markets, the centralization of industry and commerce in the great centres, and the urgent need for opening of new roads, all combined to give the highways a secondary place in the national transportation problem.

Within the last 75 years, however, the Good Roads Movement has brought the highway to a place of first-rate importance. It constitutes undoubtedly one of — if not *the* — most important chapters in rural progress of the last generation. This is indicated by the fact that in the proceedings of the Country Life Commission (1908), throughout its tour of investigation in every part of the United States, the matter of "good roads" was a universal and constant topic of discussion. Within the last 10 years too, State activities in relation to highways has become one of the largest expenditures of the State governments, ranking next after education, charities and corrections, and at times even superseding these in importance. The discovery and use of new and distinct sources of State revenues would seem to guarantee the continuance of this activity. Moreover, the new administrative arrangements under which State aid and control are carried on constitute one of the principal forms of governmental centralization in recent years.

The general strength of the movement may be judged from the following current figures: The rural public roads of the United States at the present time (1918) have a total length of 2,456,000 miles (nearly tenfold the railway mileage). Of this immense total, constituting our achievement in road-building as a nation, to date, already some 12 per cent, or 300,000 miles, are "improved" with some sort of hard surfacing. This is practically all the result of the activities associated with the Good Roads Movement since 1890.

Thus viewed the movement seems scarcely begun, and the immensity of the task of improvement appalling. But it must be remembered that at least half of this enormous mileage of pioneer highways consists of roads that are but little used and quite unnecessary. These may with advantage be closed and hence require no improvement. "Relocation" will also in a vast number of cases much reduce the distance, lessen grades and otherwise reduce the problem of good roads for the nation to the limits of a measurable task.

During recent years the total mileage of all roads has remained practically stationary, but the total mileage of surfaced roads has increased at the rate of about 15,000 miles per annum. The pioneering work of opening new roads has thus been accomplished; the problems of the present and immediate future are those of maintenance, improvement, relocation and administrative control.

The year 1917 naturally showed a decrease of 5,000 miles from the average rate, due primarily to war conditions, such as scarcity and high price of labor and materials. The increase in the cost of road work is conservatively estimated at 50 per cent, so that the continuance of the movement even at the present reduced rate is indicative of its strength and perseverance.

For the years from 1904 to 1916 the expenditures averaged an annual increase of 12 per cent. And practically every legislative session sees some new and important highway measure enacted, creating new departments and extending the powers of those already existent.

From the beginning of the present movement to good roads the total State expenditures, under State laws and State administration, have amounted to about one-third billion of dollars ($307,937,833). The rapid increase of this phase is seen in the growing importance of the State funds both in absolute amount from year to year, and relatively to the amount of local expenditure. The State aid of 1904 was $2,549,912; of 1913, $37,438,172; and of 1916, $40,969,001. Thus at present approximately 13 per cent of the expenditures on the highways of the country come from the State treasuries.

While at present there is still some $15,000,000 annually expended in the form of "convict labor" and "statute labor," this element seems liable to grow less and the measure of road improvement to be the amount of cash expenditure for skilled labor and direction.

It must not be thought, however, that State activity constitutes the Good Roads Movement. Its total volume is as yet relatively small, though concentrated and consequently more spectacular and noteworthy. Its truer measure of importance is the degree to which it constitutes a pace-maker for new ideas and policies in road work. The State and State-aided roads are practically model-roads, and not the least of the influence of the State highway departments has been their advisory and informational activities. The multitudinous local improvements, too, of the districts, townships and counties on their own initiative and responsibility constitute in total a vast volume of road betterment.

Nor can private enterprise and efforts be neglected in appraising the total movement. The great new automobile trunk lines, stretching between all the great cities, and even connecting coast with coast, are of first-rate importance, and constitute indeed the most noteworthy examples of road-improvement in the country. These, with the many minor through-roads which have resulted from the mapping of routes, associated with State and nation-wide touring, are most important, yet do not come within the scope of the data given.

Transportation has been from the beginning one of the principal problems of our national life and it has been dealt with energetically and with largeness of vision at every stage. The existing network of highways, canals and railroads flung across the continent in a century, however imperfect in detail and co-ordination, is a marvelous achievement. Similar large ideas and strenuous efforts are now being put into the Good Roads Movement. The countries of Europe, with whose highways we are accustomed to compare ours, have had no such conditions or needs to face. The history of the Good Roads Movement, more especially of recent years, is ample evidence that American road-builders can crown the work of the last century, with a couple of decades of rapid progress toward perfect highways.

For although what is technically known as State aid, and the Good Roads Movement, is not really new, it had its latter day origin in 1891 in New Jersey. Kentucky had early in the last century appropriated as a State money for the support of certain toll roads, and New Hampshire had also extended State aid for certain specified roads, but no co-operative plan between States and their subdivisions (counties, towns, townships) had been thought of, nor did any such appear until the date mentioned.

Prior to 1800 there were few roads in the country that deserved to be characterized as «improved.» In 1796 there was but one turnpike on the continent, 66 miles between Lancaster and Philadelphia, built by a private company, and hardly conforming to our ideas of a macadam road. Another noteworthy early «turnpike» (so-called from the revolving beam that obstructed the passage at the toll-gates) was the «Wilderness Road» from the Shenandoah Valley in Virginia westward to Kentucky, and still operated in 1895 by the Wilderness Turnpike Company. To supplement such private ventures, many attempts were made to secure road contributions from the National government in the early days of the Constitution, but the only road of importance so financed was the Cumberland road, largely macadam, stretching for 800 miles from Cumberland, Md., to Vandalia, Ill.

The construction of macadam roads in those days was well-nigh prohibitive from the cost and «corduroy» (log-surfaced roads) were often built, across wet and soft stretches. These became very common and with the advent of the saw-mill were supplemented by «plank-roads,» particularly for the «toll» roads. These were a great improvement over the corduroy, cheaper than the macadam to construct, but expensive in maintenance. But over such highways, aided by the rivers, canals and the beginnings of the railroad system, the great westward pioneering movement took place. Then after the wave of internal improvements had swept over the various States in the years from 1835 to 1840, road construction gradually became a local matter, except where turnpike companies continued to build stretches of toll-roads. Even for these, the advent of the railroad lessened the need. Henceforth, little private or public money was expended upon the roads; «working out the road tax» became the common method of opening and maintaining highways. Poor roads were the inevitable result and this general situation continued till long after the Civil War. Then, the rise of cities, and the beginnings of better paved streets, made glaring the contrast with the awful condition of the heavily traveled roads in the vicinity of the great cities. The agitation for better roads grew rapidly and assumed the importance of a «movement» from 1890 on, especially in the long settled and highly urban States of the East.

The widespread use of the bicycle and in more recent years of the automobile has given great impetus to the movement. In 1916 there were 3,500,000 registered automobiles — the number having doubled since 1914 — making a total of $25,000,000 available from registration and license fees, of which some $16,000,000 was under State control, and about $8,000,000 subject to the local governments. This amount constitutes almost one-half of the total annual expenditure for roads by the State governments, and is a good example of the important place the coming of the automobile plays in road improvement. The bicycle had preceded the automobile. By 1899 the «craze» was at its height, and over 1,000,000 wheels were turned out in that year. But by 1904 the interest had so fallen that the product fell to one-sixth of its former volume, and has since remained stationary. It had, however, done its work for the Good Roads Movement. The rural problem became a very conscious one also, in this last decade of the century, and gave a new meaning to every movement for the betterment of agricultural industry and country life.

The movement, too, has been greatly furthered by the progressive development of road machinery. For the use of broken stone on road surfaces depended very largely upon the development and use of road rollers and stone-crushers. Most noteworthy and epoch making of all, however, in its widespread effect upon roads in all parts of the country, was the appearance of the «King Drag.»

State action may very well be taken to mark the rise and development of the Good Roads Movement and its progress may be conveniently chronicled by the order in which the various States have so acted. Their dates are as follows: New Jersey, 1892; Massachusetts, 1893; Vermont, 1894; Connecticut and California, 1895; New York and Maryland, 1898; Maine and North Carolina, 1901; Rhode Island, 1902; Pennsylvania, New Hampshire and Delaware, 1903; Ohio and Iowa, 1904; Illinois, Minnesota, Michigan, Idaho and Washington, 1905; Virginia, 1906; Missouri, 1907; Georgia, 1908 (but still provides for convict labor only); Arizona, Colorado, New Mexico, North Dakota, Utah, West Virginia, 1909; Louisiana, 1910; Alabama, Kansas, Nebraska, Oklahoma, Nevada, South Dakota, Wisconsin, Wyoming, 1911; Kentucky, 1912; Arkansas, Montana and Oregon, 1913; Florida, Tennessee and Mississippi, 1915. Indiana, South Carolina and Texas have as yet taken no action.

Naturally the particular form and measure of action taken by these different States differs widely and it is perhaps unfair to so list them, except as a general indication of the scope and direction of the Good Roads Movement. But the general model was early set and although there have from time to time been new features added and new policies entered upon, the movement has been progressive and cumulative and is now well established in all its essential features.

In 1889 a general county-road law was passed by the New Jersey legislature, permitting counties to issue bonds for broken stone or hard road construction, and to assess one-third of the cost upon property abutting. Two years later she passed a State Aid or State Highway Law (re-enacted 1892) which was the *beginning of systematic road improvement in the United States,* under the direction of State officials and with the aid of State funds. Before the close of that year the State paid some $20,000 to Middlesex County to help meet the cost of about 10 miles of broken stone road in the vicinity of Brunswick and Plainfield. Thus was begun the Good Roads Movement of recent years.

In 1894 the official State commissioner of public roads took the place of the president of the State Board of Agriculture, who had ex-officio acted for the State. The movement was thus fairly launched with the following general policy: Under the original act the State paid 33.3 per cent, abutting property owners 10 per cent, and the counties the remainder. The initiative was with the property owners.

Soon the demand for trunk-line improvements led to the establishment of a continuous system of State roads. The cost of improvement and maintenance of these was borne entirely by the State, and all work planned and supervised by the State Highway Department. Also certain county-roads were improved by State aid, the State paying 40 per cent of the cost, if the improvement was approved by the State commission. But these roads are maintained by the counties. The funds for State aid included appropriations from the legislature and receipts from motor-vehicle licenses and fines. From such sources to the end of 1915 New Jersey had expended about $8,500,000 for road improvements. The Good Roads Movement then began under especially favorable conditions and acquired powerful initial impetus.

Massachusetts, with the same general conditions, became active in the movement about the same time. As result of a legislative committee of investigation, a State Highway Commission was established in 1893, and the first appropriation made next year. The system is more highly centralized than in New Jersey. Roads are improved by the State on petition of the local authorities, the State paying 75 per cent and the county 25 per cent. Also a certain sum is set aside each year for the direct assistance of the smaller and poorer towns.

The Massachusetts law has particular merit in being more explicit in regard to *maintenance* than are State highway laws in general, even those of later date. Of the funds derived from motor vehicle licenses 80 per cent *must* be expended for maintenance, and special appropriations are made each year for this same purpose. Also, the counties refund 25 per cent of the sums expended by the State for maintenance of State roads within their boundaries.

The funds in this State are derived from State *bond issues,* usually running five years, one-fifth being issued each year. This system of financing has enabled this State to become a leader in expenditures for road improvements, the amount to the end of 1915 being nearly $20,000,000. New York adopted State aid in 1898, but has since become the leading exponent of the system. After various changes in the scheme of organization the work was placed in charge of a single State Highway Commissioner who appoints three deputy commissioners. In their charge there are four classes of roads: (1) State roads, improved and maintained wholly by the State; (2) county roads, improved and maintained jointly by the State, county and town; (3) country roads, improved and maintained wholly by the counties; (4) town roads, improved and maintained by the towns, assisted by the State. All classes of roads are thus assisted and very large expenditures are thus called for. New York leads in amounts expended. A bond issue of $50,000,000 was authorized in 1906 for the improvement of a system of county roads (8,380 miles), to which was subsequently added a system of State roads comprising 3,617 miles. This is a landmark in the history of the Good Roads Movement and it was followed by another bond issue of $50,000,000, authorized in 1912, of which $20,000,000 was for construction and maintenance of State roads and $30,000,000 for the completion of the county-highway system. The apportionment of the funds among the counties is on the basis of population, mileage of roads outside cities and villages, and the total area, each factor having a weight of one-third. The total sum expended by the State to the end of 1915 was about $97,000,000, or nearly one-third of the total amount expended by all the States since the inception of the movement.

Ohio enacted State highway aid laws in 1904. A system of main market roads is improved and maintained jointly by the State and the counties; the county and town roads are improved and maintained by the local authorities, under State supervision. Under this arrangement the total amount of State aid to the end of 1915 has been about $8,500,000.

Iowa entered the movement the same year and has, since 1904, a State Highway Commissioner. Road improvements are made by the counties under State supervision and advice. Main roads, not exceeding 15 per cent of all roads in a county, are improved and maintained as county roads; all others are town roads. Conditions in Iowa call rather for care in maintenance through dragging than for construction, hence the total expenditure of State funds has not exceeded $300,000 by end of 1915. This great agricultural State, with its large road mileage, and exceptional number of automobiles, thus ranks lowest of any of the important States, except Indiana, in the Good Roads Movement.

The expenditure of State funds for road improvement throughout the United States has proceeded in accordance with one or other of the methods outlined above. A commission, with an executive commissioner, or one of these, constitute the models for organization. The diversion of motor-vehicle fees to State road improvement is practically universal and represents the consensus of opinion that these are the principal, though not the sole factor, in occasioning the need and demand for good roads. The distinction between State roads and State-aid roads is quite common, while a large field for strictly local effort is generally left free. There is a strong tendency to financing by extension bond issues rather than by direct appropriation. Generally the action of the State goes beyond being merely informational and advisory.

But there is still much variety both in the *manner* of giving State aid and in the *sums* given. In California the advisory board of the State department of engineering has general supervision of road work and a subdivision of this board is the State Highway Commission. The State may assist in the improvement of any road of State importance, but under the act of 1910 a specific sum was provided for the improvement of a system of State roads, which in a general way is defined in the act. The system is thus constructed and maintained wholly by the State, but the counties refund a part of the cost in small yearly instalments. Funds are derived from bond issues and by special appropriations, amounting by the end of 1915 to about $15,000,000. California thus ranks with the States which have entered largely into road building. She has special conditions in nearly every part of the State which render State aid peculiarly necessary and advisable. Other Pacific and Mountain States may likewise be expected to become foremost in State action because of similar conditions.

Missouri has established the office of State Highway Commissioner. There is a State stamp tax on certain documents, the proceeds of which are divided among the counties in proportion to the number of school children. Special appropriations are made for dragging roads. The amount of State aid to end of 1915 was about $1,500,000.

Georgia has a law for utilizing convict labor on the roads but has no State Highway Department, nor does it otherwise take part in road improvement. Delaware has a State Highway Commissioner for one county only. Alabama has a State Highway Commission. Roads are improved jointly by the State and the counties, each paying one-half the cost, but to the end of 1915 the sum amounted to only one-half million. Kansas gives no money for construction, but it has a State engineer, a part of whose duty it is to furnish plans, specifications and advice. Nebraska has a State Board of Irrigation, which gives assistance in highway bridge work and advice on road work. Oklahoma has a Highway Commissioner, whose duty it is to give advice, plans and specifications. Nevada has a State Engineer who has charge of the State-aid road work but no large appropriations have been made. South Dakota has a State Highway Commission, but merely advisory.

Wisconsin has a Chief Engineer of the State who has general supervision of road improvement. Selected county roads may be improved jointly by the State, county and town, each paying one-third the cost. Specifications and plans are furnished by the State Highway Department; the roads are maintained, however, by the counties. About $4,000,000 of State aid funds had been expended to end of 1915.

In the beginning of the movement various experiments were tried, such as steel-tracked roadways, but time-approved methods of improvement soon became standard. For many parts of the country the ordinary dirt road is probably the only economical type. When surfaced with a proper mixture of sand and clay, or topsoil, kept smooth and hard by the frequent use of a "road drag," and well drained, it makes a very serviceable roadway throughout the year, with the possible exception of the early spring months. This type of road has been the object of considerable engineering study, especially in the States of the great central valley of the United States. About one-sixth of the total 30,000 miles of State-aid roads in 1915 were of this sand-clay type.

Nearly one-half the total come under the classification of "gravel roads," a grade better than the sand-clay. These can be built for $2,500 to $4,000 a mile, and the cost of maintaining them generally does not exceed $250 a mile per year. Often these are built of bank-run gravel, but more generally a certain proportion of sand and clay or loam is mixed with the gravel to give the mixture the necessary binding qualities.

The best type of roads are, of course, the macadamized, similar to gravel roads, but with more binding. Instead of small pieces of stone in the form of pebbles and natural fragments, artificially produced fragments are used, and instead of sand and loam, rock dust is employed as the binding material. This broken stone is placed in layers and rolled with heavy steam road rollers. These roads, sprinkled with water before first rolling, are called "water-bound" macadam. Distinguished from it is the "bituminous macadam" in which asphaltic or tar binding material is used, either in place of, or in addition to, the rock dust. Also, many gravel and water-bound macadam roads, either immediately after completion or subsequently, are treated with a surface coating of liquid bituminous binder, sprinkled over with a layer of sand or stone chips. These are practically pavements.

Both gravel and water-bound macadam roads require ceaseless vigilance in *maintenance* and without this they rapidly go to pieces under *motor vehicle* traffic. The pneumatic tires of motor vehicles appear to be very destructive, especially in dry weather, by drawing out the dust binding material and causing the surface to «ravel.» Hence the vital importance of clauses in road laws relative to maintenance. To prevent this disintegration there is a great variety of materials, patented and unpatented, to be applied to road surfaces. These vary all the way from common salt and calcium chloride to the many bituminous compounds, e.g., Dustoline, Glutrine, Rocmac and numerous petroleum and tar products. These are all either «dust layers» or «road binders.» Dust layers are intended to hold the dust in the road by keeping the surface damp (as in the case of salt and calcium chloride) or by the capillary attraction of an oily liquid. The road binders have such adhesive or cementive qualities as to replace the dust as a binder and keep the road surface intact.

Other phases of the good roads movement which are important are the relocation of roads; the elimination of grades, elimination of grade crossings, the closing of unnecessary or little used roads; the provision of proper drainage; legislation regarding wagon tires and weeds; the abolition of toll roads. In some States the movement has entered into the æsthetics of road improvement, beautifying the roads with trees, erecting sign posts at crossroads, naming farms.

A new interest in the economics of road improvement has been a decided factor in the movement. It is now realized that the first cost is high but the resultant gain great, because of the increased volume of traffic on them. Nearly 100,000,000,000 pounds of farm products are annually hauled from farms to shipping points and to this must be added the enormous weight of products hauled from farms to mills and from mills back to farms; as well as the truck, forest and mine products, and the city products that go out into the country. The average cost of hauling per ton mile is about 25 cents, which foreign experience as well as government investigations have shown could be reduced to at least 12 cents or 50 per cent, making a possible saving of over $50,000,000 or about the amount now annually expended in direct State aid. The Good Roads Association was formed in 1892 and immediately resulted in increased interest. The separate States have also formed good roads associations, and the meetings and reports of these and the national association play an important part in disseminating information and arousing interest. The extension of rural mail service has been of some effect upon improvement of roads. In 1917 about 500,000 miles of roads were described and used as post routes. Indeed every phase of rural betterment calls for better roads. The movements to the centralization and consolidation of schools is closely connected with the condition of the roads.

The Office of Public Roads, United States Department of Agriculture, was established in 1893 by an appropriation of $10,000 for the purpose of making inquiries in regard to systems of road management, methods of road making and to publish and distribute information on these subjects. This bureau has been steadily increasing in importance. It has a well-equipped laboratory for testing rocks and other road materials and its staff of engineers supervises the construction of experimental and model roads in various parts of the country, and gives advice to local road authorities. Down to date it has directed the construction of some 150 object-lesson roads in 35 States. In 1915 this bureau and others were consolidated under the name of the office of public roads and rural engineering.

Very recently direct Federal aid has been extended. The Secretary of Agriculture announces the apportionment of $14,550,000 of Federal funds to be used for the fiscal year ending June 1919 by the several States in the construction and maintenance of rural post roads. This is the third apportionment under the Federal State Aid Act (1916), $4,850,000 having been appropriated for 1917 and $9,700,000 for 1918. The amounts available for the various States range from $749,674 for New York, to $24,411 for Delaware. This act has had a favorable effect on the increasing amount of expenditure for roads, for it requires that before a State can avail itself of the benefits of the act it shall have a State Highway Department, and that the State or subdivisions shall meet the Federal aid dollar for dollar. All the States are now qualified to receive Federal aid, but five States (Georgia, Kansas, Mississippi, North Carolina and South Carolina) have made no expenditures. By June 1917 there was about one-tenth (11.6 per cent) of the public roads surfaced. Of the total of such (284,047 miles) 69,186 miles had been all-State or State-aid roads. Also 16,160 miles of such State roads had been built in 1916 and 75,311 miles had been maintained with State aid in that year. State aid also built 4,490 bridges. The State funds available for 1917 amounted to over $60,000,000. There were thus vast sums available and expended, $40,969,001 of State aid funds; $33,526,553 of local moneys, a total of $74,495,554. Of this $44,469,824 was expended for construction of roads, $5,414,331 for bridge building, while maintenance of roads and bridges called for $18,452,861.

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GOOD TEMPLARS, a temperance society which combines the principles of teetotalism with certain mystic rites, imitated less or more from freemasonry, having secret signs, passwords and insignia peculiar to itself. It originated in Utica, N. Y., where it was organized by Daniel Cady and others, in 1851, and extended to England in 1868. There is no restriction placed on membership on account of color, age or sex. The organization consists of local «subordinate» lodges, county «district» lodges, national «grand» lodges and an international «supreme» lodge. A «juvenile order» is also attached, and the Templars have founded an orphanage at Sunbury, near London, at a cost of $50,000. The Prohibition party was formed in 1869 by a committee appointed by the Right Worthy Grand Lodge, the then highest governing body of the order. In 1874 Good Templar women founded the Women's Christian Temperance Union. The order maintains the Washingtonian Home for Inebriates at Chicago, Ill., and an orphans' home at Vallajo, Cal. It has no beneficiary system. Its platform consists of total abstinence from all intoxicating liquors as a beverage, no license, but prohibition of manufacture and sale, and the election of men who will enforce the liquor laws. The motto of the order is "Faith, Hope and Charity." It is an outgrowth of the Sons of Temperance. The recent reports of the international secretary returned the number of grand lodges as 70 and the membership in both adult and juvenile branches, 620,000. There are grand lodges in nearly all States of the Union, in England, Ireland, Scotland, Wales, Denmark, Germany, Sweden, Norway, Switzerland, Hungary, Rumania, Holland, Canada, the West Indies, South Africa, Australia, New Zealand, British India, Iceland and other countries.

GOOD-WILL, the benefit derived from a business beyond the mere value of the capital, stock, funds or property employed in it, in consequence of the general public patronage and encouragement which it receives from constant and habitual customers. It is legally considered a subject of sale along with the stock, premises, fixtures, trade debts, etc. It is usual for the seller to enter into an express covenant not to carry on a business of the same kind at some specified moderate distance from the place where the purchaser resides, and if he breaks the covenant he is liable to an action for damages. In most of the States of the Union the purchaser of goodwill can only cut the seller off from soliciting old customers of the business surrendered and from otherwise attempting to supplant the new tenant in popular favor, by securing a written contract.

GOODALE, Dora Read, American poet: b. Mount Washington, Berkshire County, Mass., 29 Oct. 1866. With her older sister, Elaine Goodale (q.v.), she began to write verse in early childhood. Her poems, and those of her sister, appeared in magazines at that time and attracted much favorable notice. With her sister she published 'Apple Blossoms' (1878); 'In Berkshire with the Wild Flowers' (1879); 'All Round the Year' (1880), and 'Verses from Sky Farm' (1880).

GOODALE, Elaine (Mrs. Eastman), American poet: b. Mount Washington, Mass. 9 Oct. 1863. In June 1891, she was married to Charles A. Eastman, M.D., an educated Sioux Indian. At an early age she began to write verse and with her sister Dora (q.v.) published 'Apple Blossoms: Verses of Two Children' (1878); 'In Berkshire with the Wild Flowers' (1879); 'Verses From Sky Farm' (1880). She was sole author of 'Journal of a Farmer's Daughter' (1881); 'Little Brother of Dreams' (1910); 'Yellow Star' (1911); 'Wigwam Evenings' (1909), also contributions to newspapers and magazines of articles on Indian life and character and the education of the Indian; also stories, poems and articles on child culture. She taught for some time in the Hampton Institute in Virginia, and edited the *Southern Workman* (1883). In 1885 she visited the Great Sioux reservation, and subsequently taught school at White River Camp, Lower Brulé Agency, Dakota. She afterward became supervisor of Indian schools, retaining this position until 1891.

GOODALE, George Lincoln, American botanist: b. Saco, Me., 3 Aug. 1839. He was graduated from Amherst College in 1860 and has been instructor and professor of botany at Harvard from 1872. He has published 'Concerning a Few Common Plants' (1879); Physiological Botany' (1885); 'Wild Flowers of America' (1886); 'Useful Plants of the Future.'

GOODALL, Edward, English line-engraver: b. Leeds, 17 Sept. 1795; d. London, 11 April 1870. He was self-taught, and early in his career attracted the notice of Turner, a number of whose pictures he engraved. He also engraved many plates for the annuals.

GOODALL, Frederick, English painter: son of Edward Goodall (q.v.); b. London, 17 Sept. 1822; d. London, 29 July 1904. At 17 years of age he began to exhibit and he has produced some pictures of high excellence. He was elected to the Royal Academy in 1863. Among important works of his are 'Raising the Maypole in the Olden Time' (1851); 'Cranmer at the Traitors' Gate' (1856); 'The Subsiding of the Nile' (1873); 'Andromeda' (1887); 'The Thames from Windsor Castle' (1890); 'Isles of Loch Lomond' (1891); 'The Palm Grove' (1894).

GOODELL, Henry Hill, American educator: b. Constantinople, Turkey, 20 May 1839: d, at sea, 23 April 1905. He was graduated from Amherst College in 1862; was in the Union army in 1862–63; professor in the Massachussetts Agricultural State College in 1867–86, and in 1886 became its president. For several years he was chairman of the executive committee of the Association of American Agricultural Colleges and Experiment Stations, and in that capacity did much to further the interests of agricultural education.

GOODELL, William, American missionary: b. Templeton, Mass., 14 Feb. 1792; d. Philadelphia, 18 Feb. 1867. He was graduated from Dartmouth College in 1817, and from the Andover Theological Seminary in 1820; was ordained to the Congregational ministry in 1822, and in the same year went to Syria as a missionary. In 1823 he assisted in the establishment of the mission-station at Beirut, in 1823–28 was active there, in 1828–31 at Malta, in 1831–65 at Constantinople. Among his most important works was the preparation of a translation of the Bible into Armeno-Turkish.

GOODELL, William, American abolitionist: b. Coventry, N. Y., 1792; d. 1878. He was in business at different times in Providence, Alexandria, Va., and New York; in 1827 began at Providence the publication of the *Investigator*, and later was editor of a series of abolition periodicals, including the *Friend of Man*, official mouthpiece of the New York Anti-slavery Society; the *Radical Abolitionist*, and the *Principia*. His published volumes include 'Views of American Constitutional Law' (1844); 'The Democracy of Christianity' (1851); 'Slavery and Anti-slavery' (1852); 'The American Slave Code' (1853).

GOODKNIGHT, James Lincoln, American educator: b. Allen County, Ky., 24 Aug. 1846; d. 2 Oct. 1914. He was graduated from Cumberland University (Lebanon. Tenn.) in 1871, from the Union Theological Seminary in 1879, studied also at Edinburgh and Jena, and was president of West Virginia University (Morgantown). From 1900 to 1904 he was president of Lincoln (Ill.) University, business manager of the Courier Company (of newspapers) (1904–11). His articles have appeared in various periodicals.

GOODLAND, Kans., county-seat of Sherman County; on the Chicago, Rock Island and Pacific Railroad. The manufactures are flour and machinery. The city contains railroad repair-shops and grain elevators, and is the centre of trade for a large agricultural region in which there are a number of cattle ranches. Pop. 1,933.

GOODNOW, Frank Johnson, American legal scholar: b. Brooklyn, N. Y., 18 Jan. 1859. He was graduated from Amherst College in 1879, from the Columbia Law School in 1882, studied also at the Paris Ecole Libre des Sciences Politiques and Berlin University, and was appointed to the chair of administrative law at Columbia in 1883. He became adjunct professor in 1887, and full professor in 1891. He was a member of the Public Ownership Commission to investigate municipal ownership in Europe in 1906–07, and in 1913–14 was legal adviser to the Chinese government, and since 1914 president of Johns Hopkins University. A recognized authority on municipal, administrative and constitutional law, he published ‘Municipal Home Rule’ (1890); ‘Comparative Administrative Law’ (1893); ‘Municipal Problems’ (1897); ‘Politics and Administration’ (1900); ‘City Government in the United States’ (1905); ‘Principles of the Administrative Laws of the United States’ (1905); ‘Municipal Government’ (1910); ‘Social Reform and the Constitution’ (1911), and is editor of ‘Selected Cases on the Law of Taxation’ (1905); ‘Selected Cases on Government and Administration’ (1906); ‘Selected Cases on the Law of Officers’ (1906).

GOODRICH, Alfred John, American writer on musical subjects: b. Chilo, Ohio, 1847. Largely self-taught, he was professor of musical theory in several institutions, and from 1899 directed his attention wholly to writing and private instruction. ‘Music as a Language’ (1880); ‘Complete Musical Analysis’ (1889); ‘Analytical Harmony’ (1894); ‘The Theory of Interpretation’ (1898), and ‘Synthetic Counterpoint’ (1903), are among his books and essays.

GOODRICH, Charles Augustus, American Congregational clergyman: b. Ridgefield, Conn., 1790; d. Hartford, Conn., 4 Jan. 1862. He was graduated at Yale in 1812 and held pastorates of Congregational churches in Worcester, Mass., 1816–20, Berlin, Conn., 1820–48 and Hartford, Conn., from 1848. He published ‘Lives of the Singers’ (1829); ‘History of the United States’ (1852–55); ‘Universal Traveler,’ etc. He was a brother of S. G. Goodrich (q.v.).

GOODRICH, Chauncey Allen, American clergyman and lexicographer: b. New Haven, Conn., 23 Oct. 1790; d. there, 25 Feb. 1860. He was graduated at Yale College in 1810, and was tutor there 1812–14. After a course of theological study he entered the ministry and was pastor of a Congregational church in Middletown, Conn., 1816–17; was elected professor of rhetoric and oratory in Yale 1817–39, and became professor of pastoral theology in the theological department of the college in 1839. While tutor he published in 1814 a Greek grammar, translated chiefly from the grammar of Hachenberg. This he subsequently revised and enlarged, and published under his own name. It was often reprinted, and for many years was extensively used. About 1832 he published ‘Latin Lessons’ and ‘Greek Lessons,’ in which the precepts of grammar are throughout accompanied by practical exercises — a method subsequently applied by Ollendorff to modern languages. In 1828 Noah Webster (his father-in-law) entrusted to him the superintendence of the octavo abridgment of his large dictionary, by J. E. Worcester, with discretionary power to conform the orthography more nearly to the common standard. After several years of labor, he published in 1847 greatly enlarged and improved editions of the 4to and 8vo dictionaries of Dr. Webster. In 1856 he published in 8vo the university edition of Webster's dictionary, and in 1859 a new issue of the unabridged 4to dictionary.

GOODRICH, Frank Boot (Dick Tinto), American writer: b. Boston, Mass., 14 Dec. 1826; d. Morristown, N. J., 1894. He first became known by his Paris letters to the New York *Times*. He was the author of ‘Court of Napoleon: or, Society Under the First Empire’ (1857); ‘Women of Beauty and Heroism’ (1859); ‘World-Famous Women, from Semiramis to Eugénie’ (1870), etc.

GOODRICH, Samuel Griswold (Peter Parley), American writer: b. Ridgefield, Conn., 19 Aug. 1793; d. New York, 9 May 1860. He began as a publisher in Hartford, and established himself in 1824 as a publisher in Boston. He edited there, from 1828 to 1842, *The Token*, an annual to which he contributed several tales and poems, and in which also appeared some of Hawthorne's ‘Twice-Told Tales.’ His famous Peter Parley series of popular and juvenile books was begun soon after his removal to Boston, and gradually extended to more than 116 volumes, comprising geographies, histories, travels, stories and various illustrations of the arts and sciences. The geniality of these, and the admirable manner in which the author enlisted the sympathies of children, procured for them an immense success, which led to the issue in England of some spurious books under the name of «Peter Parley.» In 1837 he published a collection entitled ‘The Outcast, and Other Poems’; and in 1838 an ethical and educational work entitled ‘Fireside Education.’ In 1841 appeared a selection from his various contributions to annuals and magazines under the name of ‘Sketches from a Student's Window’; and in 1857 ‘Recollections of a Lifetime,’ a most entertaining account of his own history and that of his contemporaries. ‘Merry's Museum’ and ‘Parley's Magazine’ were conducted by him from 1841 to 1854. Under Fillmore's presidency he acted as American consul at Paris, and published there in French a treatise on ‘American Geography and History.’ The last work from his pen was the ‘Illustrated Natural History of the Animal Kingdom’ (1859).

GOODSELL, Daniel Ayres, American Methodist Episcopal bishop: b. Newburgh,

N. Y., 5 Nov. 1840; d. 1909. Graduated from New York University (then the University of the City of New York) in 1859, he entered the Methodist ministry in the same year; in 1880–88 was literary editor of the *Christian Advocate* of New York, and in 1888 was elected bishop and became secretary of the Methodist board of education. He wrote ‘Nature and Character at Granite Bay’ (1901); ‘The Things that Remain’ (1904); ‘Peter the Hermit’ (in ‘Men of the Kingdom Series,’ 1906).

GOODWIN, Maud Wilder, American historical novelist: b. Ballston Spa, N. Y., 5 June 1856. She married Almon Goodwin in 1879. She has published ‘The Colonial Cavalier’; ‘The Head of a Hundred’; ‘White Aprons: An Historical Romance’; ‘Dolly Madison,’ a biography; ‘Historic New York’ (1898); ‘Sir Christopher’; ‘Flint’; ‘Four Roads to Paradise’ (1904); ‘Veronica Playfair,’ etc.

GOODWIN, Nat(haniel) C(arl)., American actor: b. Boston, 25 July 1857. His first appearance was made in ‘Law in New York,’ at the Howard Athenæum, Boston, and subsequently he became known in burlesque and light comedy. Among the dramas which he has since presented are ‘A Gilded Fool’; ‘In Mizzoura’; ‘An American Citizen’; his chief success ‘Nathan Hale’; and ‘The Altar of Friendship.’ He also essayed «Shylock» in Shakespeare's ‘Merchant of Venice.’ In 1907 he toured in repertoire, in 1911 he played in vaudeville and in 1912–13 he made a great success, artistic and financial, as Fagin in the centenary production of ‘Oliver Twist.’

GOODWIN, William Watson, American Greek scholar: b. Concord, Mass., 9 May 1831; d. 1912. He was graduated at Harvard College in 1851; and was Eliot professor of Greek there 1860–1901. He published ‘Syntax of the Moods and Tenses of the Greek Verb’; ‘Greek Grammar’; and a revised translation of ‘Plutarch's Morals’ (1871).

GOODY, a local name in the Southern States for a small bay fish (*Leiostomus xanthurus*), much liked as a pan-fish, and known also as «lafayette» and about New York as «spot.» It is one of the family *Sciænidæ* (see DRUM-FISH), has a deep, compressed body, bluish above and silvery below, with about 15 narrow, dark, wavy bands extending from the dorsal downward and forward to below lateral line; a round black humeral spot rather smaller than the eye. It abounds from Cape Cod to Texas.

GOODYEAR, Charles, American inventor: b. New Haven, Conn., 29 Dec. 1800; d. New York, 1 July 1860. After coming of age, he joined his father in the hardware business at Philadelphia. Among the improved implements introduced by them was the steel pitchfork, a substitute for the heavy iron fork previously used. The firm being overwhelmed by the commercial disasters of 1830, Goodyear selected as a new occupation the improvement of the manufacture of India rubber. The first important improvement made by him was at New York in 1836. This was a method of treating the surface of native India rubber by dipping it into a preparation of nitric acid. This discovery enabled the manufacturer to expose an India rubber surface in his goods, which on account of adhesiveness was before impracticable. The nitric acid gas process, as it was called, was introduced into public use, and met with great favor, especially in the manufacture of shoes, which continued to be made by that process in great numbers at Providence, R. I., until it was superseded by the invention of vulcanized rubber, for which he obtained a patent in 1844. From this period he employed himself in ascertaining new methods of employing rubber till the patents granted him were 60 in number. He received medals from the exhibitions at London (1851) and Paris (1855), but his rights were continually infringed, and he remained poor while others were enriched by his inventions. Consult Parton, ‘Famous Americans of Recent Times’ (Boston 1867); Pierce, ‘Trials of an Inventor’ (New York 1866).

GOODYEAR, William Henry, American writer on art: b. New Haven, Conn., 21 April 1846. He was graduated at Yale in 1867, and studied art history in Heidelberg and Berlin 1867–70. He traveled extensively in Europe and the near Orient in making his original studies, especially in architecture. From 1881 to 1886 he was curator in the Metropolitan Museum of Art, New York, and after 1899 he was curator of fine arts in the Brooklyn Institute Museum. He is especially known for his discoveries in the architectural refinements, particularly in mediæval church buildings. In numerous contributions to scientific periodicals he demonstrated that Egyptian, Greek, Roman and mediæval buildings are constructed with intentional asymmetry intended for optical effects. He became honorary member of societies in Rome, Edinburgh, Milan and Venice, and a corresponding member of the Society of American Architects. He has published ‘Ancient and Modern History’ (1883); ‘History of Art’ (1887); ‘The Grammar of the Lotus’ (1890); ‘Roman and Mediæval Art’ (1893); ‘Renaissance and Modern Art’ (1894); ‘Greek Refinements’ (1912), etc.

GOOKIN, Daniel, American author and official: b. Kent, England, about 1612; d. Cambridge, Mass., 19 March 1687. He came with his father to Virginia in 1621, whence he removed in 1644 to Massachusetts, in consequence of his sympathy with the doctrines of the Puritans. He settled in Cambridge, was soon after appointed a captain of militia and in 1656 became superintendent of all the Indians who had submitted to the government of Massachusetts, an office which he held till his death. He protected the fugitive regicides in 1661, was appointed one of the two licensers of the Cambridge printing press in the following year, became unpopular during King Philip's War by the protection which, as a magistrate, he extended to the Indians, and in 1681 was made major-general of the colony. His ‘Historical Collections of the Indians of Massachusetts’ bears the date of 1674, and was first published by the Massachusetts Historical Society in 1792. He is said to have written also a history of New England, of which no manuscript has been found.

GOORKHAS. See GHURKAS.

GOOSANDER. See MERGANSER.

GOOSE. See GEESE.

GOOSE-BARNACLE. See BERNICLE-GOOSE.

GOOSE-FISH, or ANGLER, a marine fish (*Lophius piscatorius*) of the order *Pediculati*, with an enormous head and mouth, no scales and brightly colored fringes about the jaws, which serve as lures to attract within reach the small fishes on which it preys; the first three rays of the dorsal fin are separated from the others, and spring barbel-like from the top of the head, nodding in the water and attracting other small fishes — hence the name «angler.» Like all fishes of its order, the carpal bones are elongated to strengthen and widen the reach of the pectoral fins, by means of which the fish leaps after its prey. The angler is popularly supposed to catch geese and other swimming birds, whence its name. It reaches a length of four feet, but is useless, and the bane of fishermen. It is remarkable for its pinkish ribbon-like masses of eggs, a foot wide, 40 feet in length, which are not uncommon in summer floating at the surface of the ocean. The goose-fish occurs on both coasts of the north Atlantic and has other names, as «fishing-frog» and «all-mouth.» Near relatives are the batfish and the frog-fishes.

GOOSE-GRASS, or GOSLING-WEED, two of the many names applied to a widely distributed troublesome weed (*Galium aparine*). See BEDSTRAW; CLEAVERS.

GOOSEBERRY, various spiny shrubs of the genus *Grossularia*, family *Grossulariaceæ*, mostly natives of the northern hemisphere, especially of North America; some species are valued for their fruit (berries), others for their flowers. Of the half dozen species cultivated, the European gooseberry (*G. grossularia*), which appeared in gardens during the 16th century, has developed the largest number of varieties and attracted the widest interest. Its progeny furnish practically all the varieties exhibited at the annual gooseberry shows of England. The fruits of some of these varieties weigh more than an ounce, having been developed by selection and crossing from an original weight of about one-quarter of an ounce. The varieties may be divided, like apples or pears, into culinary and dessert sorts. Of the American species, several of which bear finer fruits than the natural European species, *G. oxyacanthoides* is the only one that has produced widely cultivated varieties. It has also entered into many hybrids with the European species. These American varieties are all of the culinary class, or are used while too unripe to be palatable as dessert. The first one, Houghton, was introduced about 1835, and with its seedling, Browning, still commands the market.

The gooseberry is one of the easiest fruits to propagate. Cuttings of mature wood are most frequently used, but layers and suckers are also employed. The plants thrive best upon rather heavy, moist soil, and generally fail upon light soils, especially if dry. They like partial shade and northern exposure. In the South they fail. The plants may be transplanted in spring or fall, about five feet apart each way, cultivated frequently until mid-summer, trained and pruned like the currant (q.v.), but somewhat more openly, kept free from fungous troubles by the use of a fungicide (q.v.) and of insects by the use of an insecticide (q.v.). The fungi most frequently found upon the plants are mildew (*Sphærotheca mors-uvæ*) and leaf spot (*Septoria ribis*). The former, which is a surface feeder, appears upon the green parts as a frost-like gray growth, which later becomes brown. Free circulation of air, good drainage and open training of the bushes help to prevent attacks. Leaf spot produces brown spots upon the foliage, which may fall prematurely. Spraying early in the season is believed to be the only preventive. With few exceptions, the insects that attack the gooseberry also visit the currant (q.v.) and may be combated by the same remedies. Consult Card, ‹Bush Fruits› (New York 1898); Thory, ‹Monographie ou Histoire Naturelle du Genre Groseillier›; Bailey, ‹Standard Cyclopedia of Horticulture› (1915).

GOOSEFOOT, a family (*Chenopodiaceæ*) of annual or perennial herbs, rarely shrubs, with 75 to 80 genera and 550 to 600 species, of wide distribution. The typical genus (*Chenopodium*) contains about 60 species, 15 or 20 of which are native to North America, or have been naturalized, some of them almost ubiquitous weeds, such as the pigweed (*C. album*); the city goosefoot (*C. urbicum*), thriving in suburban lots and roadways; the sowbane (*C. murale*); the feather geranium or Jerusalem oak (*C. botrys*); and the now world-wide Mexican tea or wormseed (*C. ambrosioides*), from which is brewed a homemade vermifuge. Other genera contain allied weeds, as the strawberry blite (*Blitum capitatum*); the large genus (*Atriplex*) of seaside and salt-land weeds called oraches; the western white sage (*Eurotia lanata*), a gray-green, pubescent fodder plant of the western plains; the sea-blites (*Dondia*) and odd brittle glassworts of salt marshes and the spiny greasewood and Russian thistle (qq.v.). See CHENOPODIUM.

GOPHER, a name given by the early French settlers in the United States to various animals which honeycomb (Fr. *gaufre*) the ground by burrowing in it. In the Central States the name refers to the too common «striped» gopher, or ground-squirrel (*Spermophilus tridecemlineatus*), a troublesome little animal about 10 inches long, a third of which is tail, which is dark-reddish brown, with 6 to 8 light stripes, alternating with lines of dots — about 13 in all; it is yellowish below, with a broad black stripe on each side. It is a familiar object on prairies and grassy fields throughout the upper half of the Mississippi Valley, hurrying to and from its hole, or standing upright, but inconspicuous, curiously watching your movements, but ready to drop out of sight at the least alarm. The burrows are numerous everywhere and are injurious not only by the space they occupy and as traps for the feet of horses and cattle, but because they offer runways for water and so promote washing away of soil. Some of the holes are short and are merely shelters; others are long, have a nest at the inner extremity and side-chambers in which in the autumn large winter stores of seeds are laid away. Where these spermophiles are very numerous, as they have become in the grain-growing districts of Iowa, Minnesota and the Dakotas, the amount of grain stolen or shaken down is a serious tax on agriculture. Another spermophile, more common northward, is Franklin's or the «gray» gopher (*S. franklini*), which is much larger and has a harsh coat of yellowish-grizzled hair. Several other species inhabit the more western plains. All are truly ground-squirrels of the family *Sciuridæ*, and closely related to the chipmunk (q.v.).

In the farther Northwest, however, the word «gopher» ordinarily means one of the large gray rodents of the family *Geomyidæ*, distinguished prominently by having in the cheeks capacious pouches, lined with fur; hence they are called pocket-gophers and pouched rats. The most familiar species is *Geomys bursarius*, which is about nine inches long and has short legs, close ears and a short hairy tail; the fore feet are very strong, with the three middle toe-nails long and well adapted to digging, and its burrows are made with surprising rapidity. Its food includes all sorts of vegetable matters, and it often injures orchards by gnawing the roots. As fall approaches it gathers a store of seeds, tuberous roots, nuts, etc., and stows it in its deep residence-burrow, where the winter is passed in a partial torpidity varying with the climate. These provisions are carried in the cheek-pouches, which also serve to take out the loose soil from the burrows. On the Pacific Coast occur several other species, some with large, pendant cheek-pouches. In the Southern States is found a species (*G. tuza*), locally called «Salamander,» of large size and common in the sandy parts of Florida and the country north of it. The Northwest has a second and smaller kind of gopher (*Thomomys talpoides*), dusky bluish-gray in color, with the lower parts whitish, which is mole-like in its habits, and is known in Idaho as «camass-rat,» on account of its fondness for the tubers of the liliaceous plant called camass (*Camassia esculenta*) by the Indians.

All of these animals are a pest to agriculture, and are increasing rather than diminishing in settled regions, owing partly to the increased food afforded them by crops, and partly to the destruction of their natural enemies, the birds of prey, snakes, weasels, foxes, badgers, wolves, etc., which formerly held them in check. Efforts are therefore made to exterminate them in various ways, of which the most effective is by suffocating them with bisulphide of carbon, placed in their holes by saturating some porous object and rolling it into the burrow. Several pamphlets issued by the United States Department of Agriculture describe the animals and their habits, and give directions for their suppression.

GOPHER SNAKE, or **INDIGO SNAKE,** a variety of a tropical colubrine serpent (*Spilotes corais*, variety *couperi*), common in the southwestern United States and eastward to Georgia, which reaches a length of seven and one-half feet, and varies in color from brownish black in Mexico through deep blue to pure black in Florida and Georgia, always with reddish markings about the mouth and throat. The surface of the skin is so highly polished as to look glassy. «Its smooth, glittering length of blue-black body flashing with prismatic colors along the broad plates of the under surface, and its good-natured demeanor, combine to make it,» says Ditmars, «a favorite in collections.» This snake burrows beneath loose soil, and is harmless to man, aiding him, indeed, in getting rid of rats, and in destroying as its prey, gophers, ground squirrels, frogs and other pestiferous animals, including rattlesnakes. It is a near relative of the tropical rat-snakes and of the northern blacksnakes. Consult Ditmars, 'Reptile Book' (New York 1907).

GOPHER STATE, a name sometimes given to Minnesota.

GOPHER TORTOISE or **TURTLE,** a burrowing turtle (*Xerobates polyphemus*) of the southern United States, brownish in color with black head; yellowish below. It is herbivorous and gregarious, and is most frequently found in the pine barrens, where it is frequently eaten by the negroes, who are also fond of its eggs.

GORAL, Boleslaus Edward, Polish-American clergyman and editor: b. Koenigsdorf, Prussian Poland, 12 March 1876. He received his early training at Koenigsdorf, came to the United States in 1889, and received his higher education at the Seminary of Saints Cyril and Methodius, Detroit, and Saint Francis Seminary, Saint Francis, Wis. He was ordained to the priesthood in 1899 and was successively professor of Polish, German, French, Greek and Latin (1899–1906) and of homiletics and philosophy from 1906 to 1908 at Saint Francis Seminary, Saint Francis, Wis. Since 1908 he has been president and treasurer of the Milwaukee Polish daily, *Nowiny, Polskie,* and rector (1908–09) of Saint Vincent de Paul's, Milwaukee, and after 1909 of Saint Hyacinth's, Milwaukee. He was founder and editor of the *Oredownik Jezykowy* and organized the weekly *Nowiny* in 1906, changing it to a daily in 1907. He is the author of 'Zasady interpunkcyi polskiej' (1905); verses and essays 'Bells of Corneville'; translations of drama and poetry. He collaborated in 'Memories of Milwaukee County' (1900); 'The Catholic Encyclopedia,' etc.

GORAL, a goat-like antelope (*Nemorrhædus goral*) from the Himalaya Mountains. It resembles somewhat the chamois, and remains in small bands on the highest parts of the mountains. Other species or varieties inhabit the high plateaus of Tibet and Mongolia.

GORAMY, or **GOURAMI,** the Javanese name of a fish of the genus *Osphromenus* (*Olfax*), family *Anabasidæ* or climbing perches, a native of China and the Eastern Archipelago, but introduced into the Mauritius, West India Islands and Cayenne on account of the excellence of its flesh, where it has multiplied rapidly. It is deep in proportion to its length, and the dorsal and anal fins have numerous short spines, while the first ray of the ventral is protracted into a filament of extraordinary length. It is one of the few fishes which build nests, which it does by interweaving the stems and leaves of aquatic plants.

GORDIACEA, a class in the phylum Nemathelminthes (q.v.), or roundworms. They are common at times in springs, ponds and even watering-troughs. Popularly they are known as hair snakes, being supposed to develop from horse hairs that have fallen into the water. The early stages of existence are passed as parasites in the bodies of various insects, chiefly grasshoppers and crickets, from which they break out when fully grown. The adult condition is entirely without means of securing nourishment as the mouth or esophagus is occluded and the stage serves only for reproduction. Consult Ward and Whipple, 'Fresh Water Biology' (New York).

GORDIAN KNOT, a knot tied by Gordius in the rope which bound the yoke of his chariot to the axle-tree in such an artful manner that the ends of the cord could not be perceived. The Phrygians had learned by an oracle that a king would come to them riding in a car, and Gordius appearing thus at an opportune time received the kingdom. He dedicated his car and yoke of oxen to Zeus, with the knot still untied. So intricate was it that the report went abroad that the empire of Asia was promised by the oracle to him who could untie it. Alexander the Great, wishing to inspire his soldiers with courage and his enemies with the belief that he was born to conquer Asia, cut the knot with his sword, and so claimed to have fulfilled the oracle. Hence to «cut the Gordian knot» is equivalent to removing or solving a difficulty by bold or unusual measures.

GORDIANUS, Marcus Antonius, the name of three Roman emperors, father, son and grandson. The first, b. 158 A.D., had governed Africa for many years, when he was proclaimed emperor at the age of 80. He associated his son with him in the empire, but six weeks later the son was killed in fighting against the rival emperor Maximinus, and the father, in an agony of grief, died by his own hand. The grandson was proclaimed emperor by the soldiers in Rome 238 A.D., although not more than 15. He reigned six years, when he was assassinated by his soldiers at the instigation of Philip, prefect of the Prætorian Guard.

GORDON, Adam Lindsey, Australian poet: b. 1833; d. 1872. He was born in the Azores, educated in England and migrated to Australia in 1851, where he became a horse dealer and trainer and the best steeplechase rider in the country. He is one of the strongest and most distinctive of Australian poets. In narrative and sporting poems based on his own wild experiences he first taught the outlander to get at the heart of Australia. He glorifies the horse and rider in ballads that have the ring of Scott and Macaulay. A Byronic influence in his work seems never to leave it. He is a bundle of moods and at times his despair is great. His published works include 'Sea-spray and Smoke-drift' (1867); 'Ashtaroth' (1867) and 'Bush Ballads' (1870). See AUSTRALIAN LITERATURE.

GORDON, Andrew, Benedictine monk, physicist: b. Coffarach, Forfarshire, Scotland, 15 June 1712; d. Erfurt, Saxony, 22 Aug. 1751. In 1737 Gordon became professor of natural philosophy at Erfurt. He introduced improvements in the frictional electric machine, and invented what is known as the electric whirl, a device that rotates a light wheel by currents of air repelled from it by static electricity. Another invention of his was the so-called «electric chimes.» He published 'Phænomena electricitatis exposita' (1744); 'Philosophia utilis et jucunda' (1745); 'Versuch einer Erklärung der Electricität' (Erfurt 1745); 'Physicæ experimentalis elementa' (1751–52).

GORDON, Charles George («CHINESE GORDON» or «GORDON PASHA»), English soldier: b. Woolwich, 28 Jan. 1833; d. Khartum, Africa, 27 Jan. 1885. He entered the Royal Engineers as second lieutenant in 1852, and served in the Crimean War and during the Taiping rebellion, with the permission of the English military authorities, assumed the command of a special corps of Chinese, trained and led by European and American officers. With these materials he performed marvelous feats of skilful soldiership and succeeded in completely crushing the rebellion. The Chinese government was eager to express its gratitude, but he refused all offers of substantial reward. On his return to England with the rank of colonel, he was appointed chief engineer officer at Gravesend for the construction of the Thames defenses. Here, while his engineering work afforded ample scope for his military talents, the philanthropy of his nature had full scope. During the six years he lived at Gravesend his house was school and hospital and almshouse in turn. Many a waif he rescued from the gutter, establishing evening classes for their benefit and keeping sight of the more deserving till they were provided with a career in life; all this being done on his pay as an English colonel, without any private resources whatever. In 1873 Gordon was governor of the Equatorial Provinces of Egypt. Being thwarted by the governor of the Sudan in his efforts to suppress the slave trade he resigned and returned to England. He again took up the post in 1877, on condition that he should be permitted to abolish the slave trade, which he successfully accomplished. In 1880 he went to China as adviser to the government there during their strained relations with Russia. In 1881–82 he was commanding engineer in the Mauritias, and served for a brief period in the latter year in South Africa. In 1884 he paid a visit to the Holy Land. In 1881 Mohammed Ahmed, a Mussulman enthusiast, had given himself out to be the Mahdi — the long-expected Redeemer of Islam — and gathered a number of followers around him who threatened the safety of the Egyptian garrisons in the Sudan. It having been decided in 1884 that the Sudan be evacuated, the presence of an English officer of high authority at Khartum was asked, with full power to withdraw all the garrisons in the Sudan, and make the best arrangements possible for the future government of the country. Gordon, at the request of the British government, proceeded to the Sudan in the hope that his great personal influence and knowledge of the country would help to set matters right. These hopes were not fulfilled; Gordon was shut up in Khartum by the troops of the Mahdi, and for a whole year he held that town against the Arabs who surrounded him. An English force under Wolseley was dispatched for his relief, an advance corps of which sighted Khartum on 28 Jan. 1885, to find that the town had been treacherously betrayed into the hands of the Mahdi two days before, and that its heroic defender had been killed. Gordon had all the qualities which are found in a successful military leader, modified, however, by strong religious feeling which shaded into mysticism, and which latterly became so intensified as to give him somewhat the character of a religious fatalist. He left a most interesting journal, kept during the latter period of his siege in Khartum. Consult Hill, 'Gordon in Central Africa' (1881); lives by Forbes (1884); Henry Gordon (1886); Boulger (1896). An interesting chapter on his last mission will be found in Morley's 'Life of Gladstone,' book VIII, chap. IX.

GORDON, Charles William («RALPH CONNOR»), Canadian author: b. Indian Lands, Glengarry, Ontario, Canada, 1860. He graudated at Toronto University in 1883 and at Knox College in 1887; was ordained to the Presbyterian ministry and was a missionary in the mining and lumbering regions of the Northwest Territories 1890–93. He became pastor of Saint Stephen's Church, Winnipeg, in 1894, and has written 'Beyond the Marshes'; 'Black Rock'; 'The Sky Pilot'; 'The Man from Glengarry'; 'Glengarry School Days'; 'The Prospector'; 'The Foreigner'; 'Corporal Cameron'; and 'The Major' (1917); works characterized by vivid descriptions of life and scenery in the Canadian west.

GORDON, LORD George, English agitator: b. London, 26 Dec. 1751; d. there, 1 Nov. 1793. He was a son of the Duke of Gordon, in his youth served in the navy, and entered Parliament in 1774. In 1778 a bill having been passed through Parliament for the relief of Roman Catholics from certain penalties and disabilities, a society called the Protestant Association of London was formed for the purpose of procuring its repeal. In the following year Lord George was elected its president, and in June 1780 headed an excited mob of many thousands, who went in procession to the House of Commons to present a petition against the measure. The dreadful riot which ensued, in which the city magistrates acted a feeble and incompetent part, was not suppressed till after the destruction of many Catholic chapels and dwellings, the prison of Newgate — the 2,000 inmates of which formed a sensible addition to the strength of the rioters — and the house of the chief justice, Lord Mansfield. Three hundred persons were killed, 192 rioters were arrested and 25 executions followed. Gordon was arrested on a charge of high treason, but no evidence being adduced of treasonable design, he was acquitted. He was convicted in 1787 of libels on the English courts and on Marie-Antoinette, and sentenced to five years' imprisonment. For Gordon and the riots see Dickens' vivid description in 'Barnaby Rudge.' Consult also Watson, 'Life of Lord George Gordon' (London 1795; and Vol. XXI of Cobbetts' 'State Trials.' For a number of years before his death he was a zealous professor of the Jewish faith.

GORDON, George A., American Congregational clergyman: b. Aberdeenshire, Scotland, 1853. In 1871 he came to America, and in 1874 entered the Bangor Theological Seminary, whence he was graduated three years later. His first work was at Temple, Me., after which he studied for a year at Harvard, and in 1881 was pastor at Greenwich, Conn. In 1884 he became pastor at Old South Church, Boston. From 1886–90 he was university preacher at Harvard and from 1888–1901 at Yale. Bowdoin and Yale conferred on him the degree of D.D. (1893) and Harvard the degree of S.T.D. (1895). Columbia awarded him the same honor in 1903. Among his publications are 'The Witness to Immortality' (1893); 'The Christ of To-Day' (1895); 'Immortality and the New Theology' (1897); 'The New Epoch for Faith' (1901); 'Ultimate Conceptions of Faith' (1903); 'Through Man to God' (1906); 'Religion and Miracle' (1909); 'Revelation and the Ideal' (1913).

GORDON, George Henry, American soldier: b. Charlestown, Mass., 19 July 1824; d. Framingham, Mass., 30 Aug. 1886. Graduated from West Point in 1846, he was employed on various duty, later resigned from the army and practised law 1857–61. In 1861 he organized the Second Massachusetts Volunteers, and became colonel of the regiment. He commanded the United States troops in Florida in 1864, the eastern district of Virginia in 1865, and was mustered out in the latter year with rank of brigadier-general and brevet major-general of volunteers. He wrote a 'History of the Second Massachusetts Regiment' (1876), and other works on the war.

GORDON, John Brown, American soldier: b. Upson County, Ga., 6 July 1832; d. near Miami, Fla., 9 Jan. 1904. He was of Scotch ancestry, his grandfather being one of seven brothers who all fought for American independence in the War of the Revolution. He was graduated at the State University in 1852 and was, a few months later, admitted to the practise of law; but at the outbreak of the Civil War was engaged in mining operations near Raccoon Mountain, Alabama. Here was organized a company, called the «Raccoon Roughs,» of which he was elected captain. This company was assigned to the 6th Alabama Infantry, in which he rapidly rose through successive grades to that of colonel (28 April 1862). At Seven Pines, through the wounding of General Rodes, the command of the brigade fell upon him; and at Malvern Hill he led it in the grand charge of D. H. Hill's division against the Federal position. At Sharpsburg he was five times wounded. On 1 Nov. 1862 he was commissioned brigadier-general with command of a Georgia brigade of six regiments, which he led with great distinction at Chancellorsville and Gettysburg. On the march into Pennsylvania, just before the battle of Gettysburg, he reached Wrightsville on the Susquehanna, making the most extended advance achieved in the East by Confederates during the war. On the first day at Gettysburg he struck the extreme right of the Union army in Ewell's grand turning movement, by which the victory so desperately striven for by A. P. Hill was secured, and the Federals were driven through the town of Gettysburg to the heights beyond. On 6 May 1864, in the Wilderness leading two brigades, he fell at sunset upon Sedgwick's corps, driving the Federals from a large part of their works and capturing 600 prisoners, including Generals Seymour and Shaler.

On 12 May at Spottsylvania Court House, commanding Early's division, immediately after Hancock had overwhelmed Edward Johnson, Gordon by an impetuous charge first checked the Federals and then drove them back to the base of the salient, where the fight continued with great fury to the close of the day. Two days later Gordon was commissioned major-general and placed in command of Evans' Georgia brigade, Hays and Stafford's Louisiana brigades and Terry's Virginia brigade — the latter being made up of the remnants of the «Stonewall» brigade and other Virginia troops. With this command he participated, under Early, in the defeat of Hunter's expedition, the invasion of Maryland, the victory at the Monocacy, the march into the suburbs of Washington and the battles against Sheridan in the Shenandoah Valley, being especially distinguished in the surprise and rout of Sheridan's army in the early morning at Cedar Creek. Having been assigned to the command of the Second corps of the Army of Northern Virginia, he held his lines with great tenacity, and in March 1865 made the brilliant dash by which he captured Fort Steadman and parts of the line to the right and left of it. Owing to the failure of the supporting column to arrive in time, he was obliged to retire to his original position. On the retreat from Petersburg he protected the rear, and at Appomattox commanded half of Lee's army, making a last brilliant charge of that heroic but now fearfully depleted host. After the surrender he called his men about him and made them a speech remarkable for its strong declarations of faith in God and earnest exhortations to endure defeat with patience, obey the laws and rebuild their ruined homes and fortunes. He became the trusted leader of his people, was twice elected governor of Georgia, and for two terms represented his State in the Senate of the United States, on all occasions using his influence for peace and fraternity between the late warring sections. As commander-in-chief of the United Confederate Veterans' Association he possessed the enthusiastic love and devotion of his comrades, who would never entertain the idea of his retirement from the office to which they every year elected him, declaring repeatedly that death alone could remove him from that post of honor. His very successful lecture on «The Last Days of the Confederacy» was well known in both North and South. His war-time reminiscences began to appear in *Scribner's Magazine* in 1903 and were published in book form in 1905.

Joseph T. Derry,
Author of 'The Story of the Confederate States.'

GORDON, Julien. See Cruger.

GORDON, Leon, Russian writer: b. 1831; d. 1892. His early labors were in the line of education, being engaged as Hebrew teacher in the governmental schools of Welna for 20 years and doing much to improve conditions, despite charges of heresy made against him. In 1872 he was called to Saint Petersburg as secretary of the Jewish community and of the society for promoting culture among Jews, which gave him the opportunity to enlarge his literary activity. Here, too, his zeal excited enmity, and accused of participating in 1879 in the attempt to assassinate Alexander II, he and his family were thrown into prison and later exiled, but his innocence was quickly proved and he returned to Saint Petersburg, losing his former position. He then became journalist for two years and was made «honorary citizen» by the government. He was the leading Hebrew poet of his day and a prose writer of much satirical force. His work was twofold — to attack fanaticism within the camp and to defend his religion against its enemies from without. He collaborated in translating the Pentateuch into Russian.

GORDON-CUMMING, Constance Frederica. See Cumming, Constance.

GORE, Charles, English bishop: b. 1853. After studying at Harrow and Balliol College, Oxford, he became Fellow of Trinity College, Oxford (1875–95). From 1880–83 he was principal of Cuddedson College, and was selected to take charge of the Pusey Library at Oxford, which post he held from 1884 to 1893. In that year he was appointed vicar of Radley, which he left in 1894 to become canon of Westminster. From 1898–1900 he was honorary chaplain to the queen; chaplain in ordinary to the queen (1900–01); chaplain in ordinary to the king (1901). He was appointed bishop of Worcester (1902–04); bishop of Birmingham (1905–11) and bishop of Oxford (1911). He was also editor of *Lux Mundi*, in which many of his publications appeared. He is the author of 'The Holy Spirit and Inspiration' (1890); 'The Church and the Ministry' (1889); 'Roman Catholic Claims' (1889); 'Leo the Great' (1890); 'The Mission of the Church' (1891); 'The Creed of the Christian' (1895); 'The Body of Christ' (1901); 'Spiritual Efficiency' (1904); 'The Permanent Creed' (1905); 'The New Theology and the Old Religion' (1908); 'Orders and Unity' (1910); 'The Question of Divorce' (1911).

GORE, Christopher, American statesman: b. Boston, 21 Sept. 1758; d. Waltham, 1 March 1827. He was graduated at Harvard College in 1776, and studying law, was soon engaged in good practice. In 1789 he was appointed the first United States district attorney for Massachusetts; in 1796 was chosen one of the commissioners to settle the claims of the United States upon Great Britain for spoliations, and remained in London, successfully engaged in the duties of this office, about eight years. In 1803 he acted as chargé-d'affaires during the absence of the American Minister; in 1809 was chosen governor of Massachusetts; and in 1814 was elected to the United States Senate. He left about $100,000 to Harvard College. Gore Hall, the library building at Harvard, is named in his honor.

GORE-BOOTH, Eva, Irish author: b. Tissadel, Sligo, Ireland. She is well known as an advocate of women's suffrage and as a trade union worker and writer. For years she has been known also as a poet of extraordinary power and charm. Her early verse was thoroughly Irish in spirit, and one of her poems, 'The Perilous Light,' a simple but exquisite little lyric, has received such high praise and has been so widely quoted that it may be called a contemporary classic. Her published works include 'Unseen Kings'; 'The One and the Many'; 'The Egyptian Pillar'; 'The Sorrowful Princess'; 'The Agate Lamp'; 'The Three Resurrections and the Triumph of Mæve'; and

GENERAL JOHN BROWN GORDON

'The Death of Fionavar' (1916). The last named is a poetic drama, which may be described as a plea for peace, a glorification of non-resistance, a Goethe-like defense of thought against action. There is a touch of irony in the fact that this most passionately pacific work should be illustrated by so convinced and practical a direct actionist as the author's sister, the Countess Markiewicz, the most picturesque figure of the Irish uprising of 1916.

GORGEANA, gôr-jē-ăn'ą, Me., now York (q.v.), the first colonial incorporated city in the United States. On 2 Dec. 1631 a grant was made to Sir Ferdinando Gorges and others of 24,000 acres on both sides of the Accomenticus (Agamenticus, now York) River. Settlements were founded here, and on 10 April 1641 were formed into a borough named Accomenticus or Agamenticus, which on 1 March 1642 was given a city charter as Gorgeana, with a full apparatus of mayor, aldermen, courts, etc. It had an extent of three miles on the coast and seven up the river, a small tidal stream. In 1652 Maine submitted to Massachusetts; and to avoid the city charter and Gorges' rights, Gorgeana was reincorporated as the town of York.

GORGES, gôr'jĕz, Sir **Ferdinando**, colonial proprietor of Maine, «the father of English colonization in America»: b. Ashton, Somersetshire, about 1565; d. 1647. He served in the Low Countries and against the Spanish Armada, and in 1596 was appointed governor of the forts and islands of Plymouth. He was a partner in the conspiracy of the Earl of Essex, against whom he testified on his trial in 1601. When Waymouth returned in 1605 from his voyage to North America, and brought with him five Indian captives, Gorges took three of them into his house, caused them to be instructed in the English language, obtained information from them of the «stately islands and safe harbors» of their native country and determined to become a proprietor of domains beyond the Atlantic. He persuaded Sir John Popham, lord chief justice of England, to share his intentions, and in 1606 the king incorporated two companies, the London colony, and the Plymouth colony, between which was divided the territory extending 50 miles inland from the 34th to the 45th parallel north latitude. The Plymouth colony had the northern portion, which was styled North Virginia. Three ships with 100 settlers sailed from Plymouth 31 May 1607, and reached the mouth of the Kennebec in Maine, where they began a settlement, abandoned the next spring. In 1616 Gorges sent out Richard Vines with a party, which through the winter encamped on the river Saco. In 1620 Gorges and his associates obtained a new incorporation for «the governing of New England in America,» which was empowered to hold territory extending westward from sea to sea between the 40th and 48th parallels north latitude. Gorges himself united with John Mason in taking grants of the district called Laconia, bounded by the Merrimack, the Kennebec, the ocean and «the river of Canada,» and under his auspices several settlements were attempted. His son, Robert Gorges, was appointed in 1623 by the council for New England «general governor of the country.» This council resigned its charter to the king in 1635, and the elder Gorges now determined to establish a miniature sovereignty on his own domain. To this end he obtained from the king a charter constituting him lord proprietary of the province of Maine, with extraordinary governmental powers, to be transmissible with the property to his heirs and assigns. He sent his son Thomas to be deputy governor and the officers took an oath of allegiance to the lord proprietary. The province was divided into two countries, of which Agamenticus (now York) and Saco were respectively the principal settlements; the former received a city charter, as Gorgeana, in 1642. But the fatal want was a deficiency of subjects; probably two-thirds of the adult males were in places of authority; yet the little monarchy continued for nearly 10 years. When the four New England colonies formed a confederacy in 1643, the settlements of Gorges were excluded from it. On the death of Gorges — who had adhered to the Royalist side in the civil war — his colonists at length formed themselves into a body politic for the purpose of self-government and submitted to the jurisdiction of Massachusetts. Consult his 'Brief Narration of the Original Undertakings of the Advancement of Plantations into the Parts of America' (1658) in Maine Historical Society's Collections; and Baxter, 'Sir Ferdinando Gorges and His Province of Maine' in the Prince Society Publications (3 vols., Boston 1890).

GORGIAS, gôr'jĭ-ąs, Greek orator and sophist: b. Leontini, in Sicily. He flourished in the 5th century B.C., and was one of the earliest writers on rhetoric. He was one of the first who introduced cadence into prose. He also treated of commonplaces, and showed the use of them for the invention of arguments. This induced Plato to give the name of 'Gorgias' to his elegant dialogue on this subject. Gorgias is said to have reached the extraordinary age of 107 or 108 years. Two works attributed to him are extant, 'The Apology of Palamedes,' and the 'Encomium on Helena,' but their genuineness has been questioned by several critics. See Jebb, 'Attic Orators.'

GORGO, gôr'gō, or **GORGON**, according to Homer, one of the frightful phantoms of Hades; but Hesiod mentions three Gorgons, Stheno, Euryale and Medusa. They were all immortal, except Medusa. Their hair was entwined with serpents, their hands were of brass, their body covered with impenetrable scales, their brazen teeth as long as the tusks of a wild boar and they turned to stones all those who looked upon them. According to some authors, Perseus, when he went to the conquest of the Gorgons, was armed with an instrument like a scythe, by Hermes, and provided with a looking-glass by Athena, besides winged shoes and a helmet of Pluto, which rendered all objects clearly visible and open to the view, while the person who wore it remained totally invisible. With weapons like these Perseus obtained an easy victory. The head of Medusa remained in his hands, and he gave it to Athena, who placed it on her Ægis, with which she turned into stones all such as fixed their eyes upon it. The residence of the Gorgons was beyond the ocean toward the west, according to Hesiod.

GORGONIA, the type-genus of the *Gorgonidæ*, a family of alcyonarian coral-polyps, the «sea-fans» or «sea-whips,» which have a calcareous or horny axis, the colony often greatly branched and the branches anastomosing. In the common gorgonia (*Rhipigorgia flabellum*) of the West Indies and Florida Keys the branches form a flat net-work. In this and other sea-fans the short calicles of the single retractile polyps stand perpendicularly to the axis, communicating by longitudinal vessels and branching canals. While by far the greater majority of the species are inhabitants of tropical waters, in the Arctic seas, and in the deeper, cold waters of the Newfoundland banks, and on Saint George's Bank, two large species occur: *Primnoa reseda* and *Paragorgia arborea;* the latter is of great size, the stem being as thick through as a man's wrist and the entire coral-stock over five feet in height.

GORILLA, the largest of the anthropoid apes. This term is derived from the «Periplus» of the Carthaginian navigator, Hanno, who described, 500 years before Christ, an island on the west coast of Africa as full of wild men, which his interpreter called Gorilloi. When, therefore, Dr. Thomas Savage brought the first specimen of this animal to the attention of science, in 1847, the name «gorilla» was applied to it. It now appears probable that the «Gorilloi» of Hanno were probably baboons. In 'Purchas, His Pilgrims' (1613) an account is given of a great ape «called by the Europeans gorilla,» and Bowditch describes the same animal (1819) in 'Mission from Cape Coast Castle to Ashantee.' In 'Western Africa' (1856) L. Wilson made the first scientific investigation of the gorilla on the ground. The gorilla of science, of which but one species is known (*Gorilla gorilla*), is, with the chimpanzee and the orang-outang, the nearest living relative of man. Structurally it is very closely allied to the chimpanzee. The male is from five and one-half to six feet in height, while the female is much shorter, measuring generally about four and one-half feet. Both are very heavy for their height, and the male generally exceeds man in weight; both male and female have very broad and powerful chests and shoulders and exceedingly long, well-developed strong arms. The legs on the contrary are short, thick-set and consequently powerful and the hands and feet are of a like nature and description. The hair-covered body presents a grim and grayish, grizzled aspect. The skin is black, the hair being blackish and turning gray in old individuals. The skull has the supraorbital ridges greatly developed and the crest in the sagittal line is large. The arms are long, the hand reaching to about the middle of the shank, while the hands are webbed to the end of the first joint of the fingers. In the foot the heel is more apparent than in other anthropoid apes, correlated with its more terrestrial life. The gorilla walks upon all fours, a gait rendered possible by the very long arms.

These apes are limited in their distribution to the forested region of the Gaboon, and go about in families led by an old male. They are mainly diurnal in their habits, seeking their food, which is largely vegetable, during the day. At night the female and young are said to ascend a tree, while the male sleeps at its foot. The stories told of the ferocity of the gorilla are exaggerated; it is an extremely dangerous animal only when brought to bay. When defending itself against an attack the male stands erect and is said to knock his adversaries down with his hand and then to use his powerful teeth, the canines of which are greatly developed. Consult Elliott, 'A Review of the Primates' (New York 1913); Forbes, O. H., 'Monkeys' (New York 1894); Hartmann, 'Anthropoid Apes' (New York 1885); Huxley, 'Man's Place in Nature' (London 1890); Keith, 'Proceedings of the Zoological Society of London' (London 1899); 'Royal Natural History' (London 1895); 'Standard Natural History' (Boston 1885).

GORKY, Maxim, pen name of Alexei Maximovitch Pyeshkoff, Russian author: b. 14 March 1868. He was orphaned at nine, ran away and served on a Volga River steamer, and was successively a painter of ikons, scullery boy, gardener, watchman, baker, porter, vendor of apples and lawyer's clerk. At 19 in a fit of despair he attempted to commit suicide. In 1891 he wandered on foot in the company of tramps all over South Russia — the class he was afterward to depict so compellingly in his short stories. In 1892 his first story, 'Makar Chudra,' appeared in an obscure Caucasian journal; and the discerning at once observed that a new force had arisen in Russian literature. In 1906 he made an extended tour over Europe, and crossed to the United States, where on account of his bringing with him a woman who was not his wife he was subjected to a good deal of criticism and ostracized, and he left the country. In full sympathy with Russian revolutionary propaganda, was twice arrested and banished, and resided for a number of years on the island of Capri. He was permitted to return to Saint Petersburg in 1914, and joined the Russian army. He was associated with the movement that led to the dethronement of the Tsar Nicholas II in 1917. The varied scenes and persons he saw in his vagabond life among the lowest of the population furnished him with rich material for his literary work, in which he takes upon himself to interpret *la misère* as it is in western and southwestern Europe. His favorite type is the social rebel in full revolt against society. His style is like a flash-light revealing features of debased or tragic character with vivid realism, but his view of his subject is tinged with melancholy pessimism. He is great in the short story, but not so successful in his longer works. His plays abound in strong situations, but they are lacking in dramatic cohesion. Among English translations of his works may be mentioned the following: 'The Oréoff Couple' and 'Foma Gordyeef' (1901); 'Twenty-six and One' and 'Tales from Gorky' (1902); 'Heartache, and The Old Woman Izerofel' (1905); 'The Individualists' (1906); 'Mother' (1907); 'The Spy' (1908); 'A Confession' (1910); 'My Childhood' (1915); 'In the World' (1917), and the dramas 'The Smug Citizen,' and 'A Night's Lodging.' See NIGHT'S LODGING.

GORMAN, Arthur Pue, American legislator: b. Howard County, Md., 11 March 1839; d. Washington, D. C., 4 June 1906. Up to his 27th year he was a page in the United States Senate. He was then appointed collector of internal revenue in the Fifth District of Maryland. In 1869 he was made general superintendent of the Chesapeake and Ohio Canal

Company, and from 1872 was president of that corporation. His influence as a Democrat extended from the affairs of Maryland to national affairs and from the house of delegates in his native State he was elected in 1893 to serve as senator of the United States; to which office, after three years of private life, he was reelected in 1902. He was prominent in opposing the Force Bill of 1889 and took part in the reframing of the Wilson Tariff Bill in 1894.

GORRINGE, gŏr'rĭnj, **Henry Honeychurch,** American naval officer: b. Barbadoes, W. I., 11 Aug. 1841; d. New York, 6 July 1885. He came to the United States in youth, entered the Union navy in 1862 and served under Admiral Porter. He was promoted lieutenant-commander in 1865. He accomplished the removal of the Egyptian obelisk (Cleopatra's Needle), which the khedive had presented to the United States, from Egypt to New York city in 1880. He published a 'History of Egyptian Obelisks' (1885).

GORSE, or WHIN. See FURZE.

GORST, SIR **John Eldon,** English legislator: b. Preston, 24 May 1835; d. London, 4 April 1916. He was educated at Saint John's College, Cambridge. He was civil commissioner of Waikato, New Zealand, from 1861 to 1863. In 1866–68 he was in Parliament as Conservative member for Cambridge University, from 1875 to 1892 represented Chatham and from 1892 to 1906 sat again for Cambridge. He failed of re-election in the latter year. He was appointed Solicitor-General in 1885, and afterward was successively Under Secretary of State for India 1886–91; deputy chairman of committees, House of Commons, 1888–91; financial secretary of the Treasury 1891–92; rector of Glasgow University 1893–94; and vice-president of the committee of the Council on Education from 1895 to 1902. After 1903 he actively opposed Mr. Chamberlain's tariff-reform proposals. He wrote 'The Children of the Nation: How their Health and Vigor should be Promoted by the State' (1907) and 'New Zealand Revisited' (1908).

GORTCHAKOFF, gŏr-chä-kof', **Alexander Mikhail'ovitch,** Russian diplomatist; cousin of the general of the same name: b. Saint Petersburg, 16 July 1798; d. Baden-Baden, 1 March 1883. He entered the diplomatic service in 1824 as secretary to the Russian embassy in London. His experience in diplomacy was extended in Vienna, Florence, Stuttgart and elsewhere, and he showed great skill in securing the neutrality of Austria during the Crimean War. In 1856 he became Minister of Foreign Affairs, and in 1862 Chancellor of the empire, having by that time made himself one of the foremost diplomatists of Europe. He was friendly to the North during the Civil War in the United States, and his attitude helped restrain France and England from openly recognizing the Confederate government. He maintained close and friendly relations with Bismarck until 1878 when at the Berlin Congress over the war with Turkey he felt that Russia had been deserted by Germany. He set about negotiating the Franco-Russian entente, and Bismarck retaliated by forming the Triple Alliance. De Giers succeeded Gortchakoff as Minister of Foreign Affairs in 1882, but he continued in the office of chancellor until his death. Consult Bismarck, 'Autobiography,' trans. by Butler (New York 1899); Klagko, 'The Two Chancellors,' trans. by Tait (ib. 1876); Ranband, Alfred, 'A Popular History of Russia,' Vol. III (Boston 1882). See RUSSIA; RUSSO-TURKISH WAR.

GORTCHAKOFF, PRINCE **Mikhail,** Russian general: b. 1795; d. Warsaw, 30 May 1861. He took part as an artillery officer in the battle of Borodino in 1812 and served in the subsequent campaigns of the allies against the French. He acquired also a brilliant reputation in the Polish War of 1831; and in 1846 he was made governor of Warsaw. In 1855 he was appointed commander-in-chief in the Crimea, where he conducted the defense of Sebastopol. In 1856 he returned to Poland as governor of the country. By his express desire his body was carried to Sebastopol and buried in the place he had so long and so bravely defended.

GORTON, Samuel, New England enthusiast and first settler of Warwick, R. I.: b. Gorton, England, about 1600; d. Rhode Island, November or December 1677. He did business in London as a clothier until 1636, when he embarked for New England and settled at Boston. Religious disputes induced him to remove to Plymouth, where we first hear of him as a preacher. He soon exhibited such peculiar views that he was banished from the colony on a charge of heresy. With a few followers he then went to Aquetneck or Rhode Island, which had recently been settled by exiles from Massachusetts Bay; but falling again into trouble, was publicly whipped for calling the magistrates «just asses» and for other contemptuous acts and was forced to seek an asylum with Roger Williams in Providence about 1641. Here he became involved in the disputes of the colonists on certain questions of boundary. Gorton was then summoned to Boston but refused to recognize the jurisdiction thus assumed and about the same time removed to Shawomet, on the west side of Narragansett Bay, where he purchased land from the Sachem Miantonomo. But in June 1643 two inferior sachems contested his claims to the land and applied to the General Court at Boston for assistance. A body of 40 soldiers were consequently marched to Shawomet and Gorton and 10 of his disciples were carried to Boston and condemned to hard labor, a sentence commuted to banishment in 1644. Gorton then went to England, where he obtained from the Earl of Warwick an order for the land he claimed. Returning to Rhode Island in 1648 he founded the town of Warwick, thenceforth his home and where he occasionally preached. He wrote several controversial works, the best known of which is 'Simplicitie's Defense Against Seven-Headed Policy' (1646). See Janes, 'Samuel Gorton' (1896).

GÖRZ, or GORIZIA, capital of the Austrian province or crown-land Görz and Gradisca, near the head of the Adriatic, 23 miles north-northwest of Trieste (34 miles by rail). The province, which was once part of ancient Illyria, later of the duchy of Friuli, and a separate duchy from the 11th century, came into Austrian possession in 1500. Containing a large Italian population, the territory has always been regarded (by the Italians) as part of that «Italia Irredenta» which it was hoped to reunite with the mother country. The area is about 1,130 square miles and the population about 250,000. The town of Görz lies in a fertile plain on the left bank of the Isonzo River, on the Trieste–Nabresina–Comorns line of the Austrian Southern Railway and had a population of nearly 33,000 (mainly Italians) before the war. It possesses a fine 14th century cathedral, is the seat of an archbishop, and has important industries in manufacturing silks, cotton, leather goods, pottery, etc. Charles X of France died here in 1836 after losing his throne. On 8 April 1915, eight months after the outbreak of the European War, the Italian government formulated certain demands upon Austria-Hungary, insisting *inter alia* on the cession of the Trentino and the creation of a new eastern frontier, to include Görz and Gradisca. The rejection of the proposed terms led Italy to declare war on Austria 23 May 1915. General Cadorna, the Italian commander-in-chief, directed his initial operations toward the points of a great triangle formed by Trent, Tarvis and Görz, by which movements he proposed to keep the Austrians employed and prevent any flanking strategy while meantime striking with his main army at the Isonzo on the road to Trieste, to an advance on which the isolation and capture of Görz was a necessary prelude. After nearly 15 months of severe fighting on one of the most difficult and complex of all the European battle-grounds, the Italians succeeded in capturing Görz, no longer the pleasant city among orchards which had once made it a fashionable health resort — the Austrian Nice — but a dusty, shell-scarred landscape. The immense geographical obstacles which the Italians surmounted made the event a great achievement. The fall of Görz (Gorizia) created great enthusiasm among the Allies and especially in Italy, which declared war also on Germany 18 days later (28 Aug. 1916), although for over a year the Italians had already been fighting against German officers, soldiers and sailors. As before in Galicia during 1915, the German war command was called on to reconquer lost Austrian territory. On 24 Oct. 1917 a powerful Austro-German offensive opened against the Italian front; in four days Görz was recaptured and by the end of the year the enemy was in possession of nearly the whole of the eastern salient of Italian territory adjoining Austria. See Italy and the War; War, European: Italian Campaigns.

GOSCHEN, gō'shen, **George Joachim**, Viscount, English statesman: b. London, 10 Aug. 1831; d. Hawkhurst, Kent, 7 Feb. 1907. He was educated at Oxford, became a director of the Bank of England at the age of 27 and entered Parliament as a Liberal for the city of London in 1863, which he represented until 1880. His business ability, great debating powers and knowledge of foreign affairs, quickly gained him the respect of the House of Commons and he became vice-president of the Board of Trade in 1865, Chancellor of the duchy of Lancaster in 1866 and First Lord of the Admiralty 1871–74. With M. Joubert he went to Egypt in 1876 on behalf of the bondholders to reorganize the finances of that country and two years afterward represented Great Britain at the International Monetary Conference held in Paris. He was Ambassador extraordinary at Constantinople 1880–81. He declined a place in Mr. Gladstone's Cabinet in 1880 as he was opposed to further extension of the franchise and represented Ripon in that Parliament. In 1885 he was returned for East Edinburgh and on the conversion of Mr. Gladstone to Home Rule became one of his most strenuous opponents and is described by Gladstone as "in the main supplying brains, soul and movement to the dissentient Liberals." At the election of 1886, fought on Home Rule, he lost his seat in Edinburgh. When Lord Randolph Churchill resigned precipitately from the Chancellorship of the Exchequer in 1886, he "forgot Goschen" as a possible successor, to which he was immediately appointed. After an electoral defeat at Liverpool he was returned for the city of London, a constituency which he continued to represent until his elevation to the peerage in 1900. His chancellorship gave scope for his great abilities in finance and is remembered for his successful "conversion" of the national debt. From 1895–1900 he was First Lord of the Admiralty. In his later years he combated with all his old vigor and incisiveness Chamberlain's scheme of tariff reform and was a tower of strength to the free trade Unionists. He was the author of a standard work on 'The Theory of Foreign Exchanges' (1864); of the 'Life and Times' of his grandfather, George Joachim Göschen, a famous Leipzig banker; and of 'Essays and Addresses on Economic Questions' (1905). His 'Life,' by A. R. D. Elliot, was published in two volumes in 1911. His youngest brother, Sir William Edward Goschen (q.v.) was British Ambassador at Berlin, 1908–14.

GOSCHEN, Sir William Edward, British Ambassador: b. 18 July 1847. He was educated at Rugby and Oxford University. He entered the diplomatic service in 1869, was attaché at Madrid, and one of the secretaries successively at Madrid (1873), Buenos Aires (1873), Paris (1875) and Rio de Janeiro (1877). He accompanied the special embassy of his brother, G. J. Goschen (afterward Viscount Goschen) to Constantinople in 1880, becoming second secretary at that capital in the following year, and secretary of the legation at Pekin (1885), Copenhagen (1888), Lisbon (1890) and Petrograd (1894). He was for a short time chargé-d'affaires at Washington; envoy extraordinary and minister plenipotentiary at Belgrade, 1898–1900, and at Copenhagen 1900–05. From 1905–08 he was Ambassador at Vienna, and from 1908 until the British declaration of war on Germany on 4 Aug. 1914, was Ambassador at Berlin. His final interview with Dr. Bethmann-Hollweg, the German Chancellor — when the latter, in reply to the British Ambassador's intimation that the violation of Belgian territory by German forces would be followed by a British declaration of war, declared that it was just for a word, "neutrality," "just for a scrap of paper," that Great Britain was going to make war on a kindred nation — is historic.

GOSFORD, Archibald Acheson, 2d Earl of, British colonial governor: b. 1775; d. 1849. He was appointed governor-in-chief of Canada in 1835, and held office during the rebellions of 1837–38. He begun by endeavoring to conciliate the assembly of Lower Canada, but the publication of his secret instructions by the lieutenant-governor of Upper Canada, in which he was empowered to make no concessions to the constitutional demands of the majority, precipitated a conflict. His instructions for the arrest of Papineau and O'Callaghan was the immediate cause of the rising in the lower province.

GOSHAWK, a falcon of the genus *Astur*. The goshawk proper, or «gentle falcon» (*A. palumbarius*), was a favorite bird in falconry (q.v.), and is still used for large game, as rabbits, pheasants and the geese from which it took its name. It is 21 inches in length, the crown, black, bordered on each side by a line of white, finely speckled with black; upper parts, slate, tinged with brown; legs, feathered half-way down, and, with the feet, yellow; tail-feathers with pale bands. It is to be found throughout Europe and central Asia; and it is a question whether the American goshawk (*A. atricapillus*) is really specifically different. The latter is a noble bird whose home is in the north, so that it is rarely seen south of the Canadian line except in winter, and uncommonly then. In its boldness, its marvelous power and control of flight, and its prey, it resembles our more familiar little falcons, the sharpshin and Cooper's hawk. Several other species inhabit the Orient, an Australian one being remarkable for its pure white color, with red irides.

It should be noted that the bird called «goshawk» in Scotland is the peregrine.

GOSHEN, the land given by Pharaoh to Jacob and his family in Egypt. Authorities differ as to the exact location of this piece of territory, but it is generally agreed that it occupied the district between the brook of Egypt and the Nile delta. Jacob's descendants lived here until the exodus. (Gen. xlv, 10; xlvi, 28, 34; xlvii, 27; l, 8; Ex. ix, 26).

GOSHEN, Ind., city, county-seat of Elkhart County, on the Elkhart River and on the Cleveland, Cincinnati, Chicago and Saint Louis and the Lake Shore and Michigan Southern railroads, about 25 miles southeast of South Bend and 95 miles southeast of Chicago. It is situated in a fertile agricultural section of the State. Its principal industrial establishments are flour-mills, bicycle and machine shops, woolen-mills, farm implements, condensed milk plants, steel tanks, sash and door factories, veneering and furniture shops; rubber goods, underclothing, mittens and shirts are manufactured here. The city has large lumber, coal and brick yards. Hay, grain and live stock are the chief farm products shipped from Goshen to larger markets. The public library building, city hospital, Goshen College and the high school are the principal public buildings. The mayor holds office for four years. The city owns and operates the electric-light plant and the waterworks. Pop. 8,813.

GOSHEN, N. Y., village, railroad junction, and one of the county-seats of Orange County, on the Erie and the Lehigh and New England railroads, 59 miles northwest of New York. Goshen was founded in 1714 and incorporated in 1809; it has municipal waterworks. It contains a hospital, a sanitarium and a public library. The manufactures include bricks, road carts, tiles, glass, cider and foundry products, but the chief commercial interests are connected with the dairying industry, there being a considerable trade in milk, butter and cheese, which are widely celebrated for their excellence. The government is administered by a president and four trustees, elected annually. Pop. 3,081.

GOSLING-GRASS. See BEDSTRAW.

GOSNOLD, gŏs'nōld, **Bartholomew,** English voyager to America: d. Jamestown, Va., 22 Aug. 1607. He joined Raleigh in his attempt to colonize Virginia, and after the failure of that enterprise was placed in command of an expedition fitted out at the cost of the Earl of Southampton and others for planting a settlement in New England. He sailed from Falmouth 25 March 1602, with one small vessel and a company of 32 persons, 20 of whom were colonists. Steering directly across the Atlantic, in seven weeks he reached Massachusetts Bay, first seeing land probably not far north of Nahant. Thence he turned south and landed on Cape Cod, to which he gave the name it still bears. Sailing around the promontory and stopping at the island now known as No Man's Land, but which he called Martha's Vineyard, Gosnold anchored at the mouth of Buzzard's Bay and resolved to plant his colony on an island which he called Elizabeth, and which now bears the Indian name of Cuttyhunk. The adventurers here built and fortified a house, but the hostility of the Indians, scarcity of provisions and disputes about a division of the profits, disheartened them, and the whole party returned to England, taking a valuable cargo of sassafras root, then highly esteemed as a medicine, cedar, furs and other commodities. Gosnold next turned his attention toward Virginia, and after long effort succeeded in organizing a company for colonization in that region, the heads of which were Edward Wingfield, Robert Hunt and the famous Capt. John Smith. A charter was granted them by James I, 10 April 1606, the first instrument of that nature under which the English were planted in America; and on 19 Dec. 1606 Gosnold set sail with three small vessels and an ill-assorted band of 105 adventurers, only 12 of whom were laborers and very few mechanics. After a tedious voyage, a storm having driven them into Chesapeake Bay (26 April 1607), they sailed up James River, which they named after the king, disembarked about 50 miles above its mouth and founded the settlement of Jamestown. Sickness and various disasters destroyed 50 of their number before autumn, among whom was the projector of the colony. The Massachusetts township of Gosnold, comprising the Elizabeth Islands, was named in his honor.

GOSPELS, Apocryphal. These are sometimes called the uncanonical Gospels because they were not included in the New Testament Canon. They are also called Pseudepigraphal Gospels, because of the lack of authenticity for their contents. Some are probably lost entirely and others have descended to us in fragments only. James Moffat in his superb article «Gospels — Uncanonical» in Hastings's Dictionary of the Apostolic Church (Vol. I. pp. 478–506) classifies these writings under three heads: (1) Gospels relating to the birth and infancy of Jesus; (2) General Gospels similar to the synoptics; (3) Gospels of the passion and resurrection. In a general way we shall follow his order.

The Protevangelion of James.— The oldest manuscript known dates back to the 10th century in the Greek. It was first published by Bibliander at Basel in 1552 in a Latin version by William Postell, a traveler who had found it in current use in some of the Eastern churches. One or two modern scholars hold that it had a Semitic original from which the birth stories of Matthew and Luke are taken. The contents of the Gospel deal with the lament of the priest Joachim and Anna that they have no child, the subsequent birth of Mary, the selection of Joseph and his marriage to Mary; their journey to Bethlehem; the birth of Jesus, the flight into Egypt and the murder of Zechariah, the High Priest.

The Gospel of Thomas, the Israelite.— The oldest manuscripts of this gospel are of the 14th or 15th century. Zahn dates the original gospel early in the 2d century, but scholars generally place it at a much later date. It is thought that it had its origin among the Gnostics or Manichæans. The Gospel gives the story of Jesus learning the Greek alphabet and other stories of the childhood of Jesus. Some of its materials were used in the Gospel of the pseudo-Matthew and the Arabic Gospel of the Infancy.

The Gospel of Pseudo-Matthew.— So named by Tischendorf, the first editor of the Latin Text. It was paraphrased by Hrotswitha, abbess of Gandersheim in the 10th century, in Latin hexameters. The details regarding the flight into Egypt are very full. It also contains the incident of the taming of the lions.

The History of Joseph, the Carpenter.— Was preserved in the East in an Arabic translation first made known in Europe by Isidore de Isolanis at the commencement of the 16th century. It was not published until 1722 when Wallin printed it from an Arabic manuscript of the 13th century accompanied by a Latin translation. It claims to be the story told by Jesus to the disciples on the Mount of Olives. It is of Egyptian origin not earlier than the 4th century. There are also four Sahidic fragments of other Nativity Gospels.

Among the general gospels there are four called «Jewish Christian Gospels» because they originate from that source. They are: The Gospel of the Hebrews, The Gospel of the Nazarenes, the Gospel of the Twelve and the Gospel of the Ebionites.

The Gospel of the Egyptians.— So called because it circulated among them; is referred to by Clement of Alexandria, Origen and Epiphanius. Its origin has been ascribed to the Essenes with a very early date.

The Gospel of Peter.— Of very early origin. It is said to have been used «either for private reading or in public worship, by the Church at Rhossus on the coast of Syria not far from Antioch in the last quarter of the 2d century.» It may have been of Gnostic origin as there are some elements in it that seem to be Gnostic in character.

The Gospel of Basilides.— Of Alexandrian origin, the group claiming to have the authority of Peter's interpreter Gloucias in matters of doctrine. It was composed before the middle of the 2d century. It is referred to by Origen. By some critics it is conjectured that Basilides prepared an edition of the Gospel of Luke for his own purposes.

The Gospel of Marcion.—An edition of Luke prepared by Marcion for those who like himself were antagonistic to Judaism.

The Gospel of Apelles, the disciple of Marcion, is only a conjecture. The text is not known. The thought that such a Gospel is in existence is based on a single passage in Epiphanius.

The Gospel of the Naassenes, a Gnostic sect, is only known through several quotations found in the Philosophoumena of Hippolytus.

Oxyrhyncus Fragments.— The excavations in Egypt in recent years have yielded some remarkable results in the discovery of various early Logia of Jesus, edited and published by Grenfell and Hunt in 1897, 1907 and 1911. In 1896 Forbes Robinson published several Sahidic fragments of importance, but not earlier than the 3d century. See AGRAPHA.

The Gospels dealing with the Passion and Resurrection are nine in number.

The Gospel of Philip.— Exists in a mere fragment preserved by Epiphanius. It is referred to in the 'Pistis Sophia.' It was in use by an Egyptian Gnostic sect during the 4th century. It probably had its origin in the last quarter of the 2d century.

The Gospel of Matthias.— Matthias was elected an apostle after the Resurrection and it is assumed that he received secret revelations from Jesus. There are no quotations from the Gospel, but Clement of Alexandria quotes from the 'Traditions of Matthias.' According to Hippolytus the 'Traditions' seem to have originated with Basilides and Isidore.

The Gospel of Mary.— Exists in three fragments only, one of which is in Coptic. It had its origin among the Barbelo Gnostics whom Irenæus refuted.

The Gospel of Bartholomew.— Exists in Latin, Greek and Coptic fragments, some of them as early as the 9th century. According to the fragments Jesus allows Bartholomew to see and interrogate Satan. He is 600 cubits high and 300 broad and is guarded by 6,064 angels. Bartholomew kicks and infuriates Satan and learns from him some of his secrets for tempting men.

The Gospel of Nicodemus.— Is sometimes called the 'Acts of Pilate.' In recent years it had been very widely circulated. It gives an account by a supposed eyewitness of the trial and death of Christ with many fabulous additions. It is probably not older than the 4th or 5th century.

The Gospel of Gamaliel.— Is largely conjectural as to its existence. Various fragments have been considered to belong to it, but without certain proof.

The Gospel of Perfection.— Originated among the Ophite Gnostics according to Epiphanius. It is alluded to in the 'Pistis Sophia.' Further than this neither details nor quotations are preserved for us.

The Gospel of Eve.— Of Gnostic origin and Epiphanius preserves the only quotations from it that have come down to our day.

The Gospel of Judas Iscariot.— Composed by Gnostic Cainites in the 2d century. It represents Judas as having a very avaricious wife who encouraged him to steal from the Apostolic purse for her benefit. At her instigation he finally betrayed his Master in order that he might again minister to her greed.

In addition to these gospels there are a number of Coptic unclassified fragments dealing with the Passion and Resurrection which are of undoubted early origin, in some cases a near approach to Gospel quotations. In fact they may be passages carelessly quoted from the canonical Gospels. The most famous fragment was a bit of papyric discovered at Fayum. It is of the 3d century and was first published by Gustav Bickell in 1886.

In addition to all the above documents, the following are mentioned by the early fathers of the Church. There are no fragments or quotations from them in existence known to the scholars of this day: ‘The Acts of Andrew’; ‘The Gospel of Andrew’; ‘The Gospel According to the Twelve Apostles’; ‘The Gospel of Barnabas’; ‘The Gospel of Cerinthus’; ‘The Revelation of Cerinthus’; ‘Epistle of Christ to Peter and Paul’; ‘Gospel of the Encratites’; ‘The Book of the Helkasaites’; ‘The Gospel of Hesychius’; ‘The Book of James’; ‘The Gospel of Jude’; ‘The Revelation of Stephen’; ‘The Gospel of the Scythians’; ‘The Gospel of Thaddæus’; ‘The Gospel of Truth’) in use among the Valentinians), and ‘The Gospel of Valentinus,’ besides many general Acts of the Apostles and specific acts of individual apostles that may have had some bearing on the gospel narratives.

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GOSPELS, The. The name Gospel is directly derived from the AS *gŏdspel* (=God-message), but ultimately from the earlier form *gōd spel* (= good message), a phrase probably coined to represent, as it does very exactly, the Gr. εὐαγγέλιον. The Gospels are four brief books of the New Testament which present to the reader something of the life, teachings, death and resurrection of Jesus Christ. They are often called so many «lives of Christ,» but this is an error as the main interest and intent is in none primarily historical or biographical. They are in every case writings with a purpose, viz., to present to believers in Jesus such facts in relation to him as seemed to the writer most important and useful. The author of the third Gospel definitely asserts that he wrote to give to his first reader certainty as to the matters in regard to which there had been oral instruction (i, 4); and the fourth Gospel had for its avowed and manifest object to set forth the deity of Jesus (xx, 31).

The first use of the term Gospel was not in reference to written documents. It rather applied to the message of truth and life brought by Jesus Christ (Rom. i, 1), and it is nowhere in the New Testament employed in reference to the books now called Gospels. Instead we find in Justin Martyr's writings what seems to have been the name first used for these books, «Memoirs,» but in the second half of the 2d century the use of the title later universally employed may be distinctly traced. The form of the title uniformly prefixed to these books reminds us of the earlier signification of the word. The phrase «The Gospel according to Matthew,» «according to Mark,» implies to be sure an assertion of authorship, but the thought is not of so many distinct Gospels, but rather of the one and single Gospel as variously presented by the several evangelists. In a similar way there are found in the Fathers references to the «threefold» and «fourfold» Gospel. When, however, the books were once called Gospels, the name passed into uniform and permanent use. In the present article such facts will be presented as relate to all the Gospels or to several of them, while for such considerations as apply to a single Gospel by itself one should consult the article bearing the name of its author.

The Synoptic Gospels.— Practically from the beginning it has been recognized that there are peculiar resemblances among the first three Gospels which require us to group them together over against the fourth Gospel which is in many ways markedly distinct from the others. The name «Synoptic» is commonly applied to Matthew, Mark and Luke because they agree in giving a “common view” of the facts about Jesus, which is implied in the Greek word σύνοψις though the English derivative, «synopsis,» has come to have a very different signification. While Matthew and Luke contain large additions to the stock of material common to all three Synoptics, and in these additions vary markedly from each other, yet comparison readily shows that the framework as to place and time is common to all three; that many events and some teachings are related in all; and that there is often a striking similarity in the language employed, a resemblance so exact that, for example, the same parenthetic explanation uniformly interrupts the report of the words spoken in connection with the cure of the paralytic. These resemblances are so many and so marked that the idea that the first three Gospels are so many independent compositions is now rejected by scholars with practical unanimity. On the other hand, there are also striking divergences and diversities; not only are there facts and teachings peculiar to each of the Gospels, but also the flow of the narrative common to all three is often interrupted by most noticeable variations. The fact of the simultaneous existence of such remarkable agreements and disagreements has given rise to the so-called «synoptic problem,» which for more than a century has occupied so large a place in New Testament criticism with the endeavor to find a hypothesis which will plausibly explain the phenomena.

The principal solutionst proposed have been: (1) that of an oral gospel underlying all three; (2) of dependence of one upon another or others; (3) of a written source or sources.

1. The argument in favor of the oral gospel hypothesis is simple and not without a certain plausibility. It will be admitted by all that the gospel story must have been first transmitted orally, and we have only to think of this oral transmission in a certain way to find a sufficient solution for the problem. But when we come to inquire how there could have been such oral transmission as would provide at once for the agreements and the differences, the solution seems less plausible. Further, in the prologue to Luke we find a statement that already there had come to be numerous arrangements of the gospel material, and these arrange-

ments can be thought of only as in written form. Accordingly the theory that the oral gospel explains the phenomena in question is set aside to-day almost unanimously.

2. The dependence theories have been so many that it would seem that every combination possible had been urged. Only two of the most important can here be mentioned. (a) As there is very little in Mark which cannot be found in Matthew or Luke, if not indeed in both, it has been held that Mark was only a copyist and abbreviator of the other two. But this does not commend itself on further consideration. There is some material which is peculiar to Mark, and this possesses such tokens of originality, such freshness and picturesqueness, that it does not seem possible that the author could have been merely a copyist. Nor is it credible that a competent copyist could have neglected and thrown aside so much interesting and important material as is found in Matthew and Luke beyond what is paralleled in Mark. (b) Only one other form of the dependence hypothesis has sufficient plausibility to deserve even mention here. It has been held by some that Mark was used by Matthew, and then that both Mark and Matthew were employed in the construction of Luke. But unless supplemented from the theory of sources this explanation fails to explain where the material in Matthew, additional to Mark, was obtained, and, in turn, how the writer of Luke made such additions to the Gospels which lay before him.

3. For a long time now the theory that the evangelists used written sources as a basis for their work has more and more occupied the field, so that the points now chiefly argued are the number and character of the sources employed. It is very widely accepted that the principal source of Matthew and Luke is found most completely in Mark, if that Gospel was not indeed used by them in its present form. While the latter hypothesis is often put forward or implied, it is doubtful if those who accept it appreciate the serious difficulties which beset this view. On the one hand, there is much in Mark which it seems incredible that the author of Matthew, and especially Luke with his desire for completeness and his keen sense of literary values, could have overlooked, as, where Mark is fuller than Matthew or Luke, the additions are usually striking; on the other hand, the second Gospel itself shows distinct traces of being more than an accumulation of material, of being in its present form the work of one who edited the material which he had collected and combined it into a well-ordered literary whole. Hence many scholars hold that the common basis of all the Synoptic Gospels is a source, which is not, to be sure, our present Mark, but which is best reproduced in that work and with the least addition of other material, and so may well be called the Marcan source, or, as some prefer to style it, "Ur-Markus," that is, the original source of Mark. This source gave the local and chronological framework for all the Synoptics, and, so far as it went, provided each and all of them with much of their material. How it arose, when and where, who was the author, was it John Mark, or was he the author who on the basis of these notes, together with a limited amount of other material, wrought out the second Gospel, all these questions remain for future investigation, perhaps will long remain matter for speculation. (See article MARK, GOSPEL OF). This same source underlies Matthew and Luke no less than Mark, although it is regarded by many as almost certain that the other evangelists did not possess the "Marcan source" in the same form in which it appears in the second Gospel. The origin of these variations and their extent is likely, however, to remain problematical. One of the most striking theories is that the evangelist Mark himself issued no less than three editions of his work, the first having been put out at Jerusalem, which was utilized by Luke who became acquainted with it during his stay at Jerusalem or Cæsarea; the second at Alexandria which edition Matthew used in the first Gospel, and the third and final edition at Rome in the form which remains our second Gospel.

A statement from Papias, who lived during the first half of the 2d century, has been preserved to the effect that "Matthew composed the Logia in the Hebrew language" (more correctly in modern speech in Aramaic). Late criticism very largely makes this document the second main source to be traced in both Matthew and Luke, though scholars differ widely as to the contents and even as to the character of the document. Even the name given to it varies, as German scholars prefer to style it "Q" (from Quelle). So much discourse material in both Matthew and Luke may plausibly be ascribed to this source that not a few have been inclined to consider that it was merely a collection of the discourses of Jesus, an edition of his sermons, as it were. But as the Greek word "Logia" means "Oracles," rather than "Discourses," it may also have contained narrative, at least enough to give the setting of the speeches, perhaps more. Various attempts have been made not only roughly to indicate its probable scope and nature, but even, by combining what in Matthew and Luke may plausibly be attributed to it, to reproduce it supposedly much as it was. But when we remember that if we did not have Mark, but only Matthew and Luke, it would have been impossible to reproduce with accuracy the Marcan source on which both are based, it may well seem hopeless, if not absurd, to claim any certainty for proposed reproductions of the "Logia." It has repeatedly been suggested, and with much plausibility, that the first Gospel was attributed to the Apostle Matthew because it was he who was the author of the collection of Discourses of Jesus and other matter relating to him which is the source of so much of that Gospel. It is indeed held by most that, except the first two chapters, practically the whole of Matthew may be referred to one or the other of the Marcan or "Logia" sources. See article MATTHEW, GOSPEL OF.

While attempts to find some traces of the use of the "Logia" in Mark have not been received with favor, it is plain that this source was largely employed in the composition of Luke. There is one marked difference to be noted, that in Luke the attempt is made to give the sayings of Jesus in their original setting, while in Matthew they are collected into long discourses as if spoken continuously. The "Logia" may of course have been somewhat modified in transmission, so that the document did not lie in identical form before the authors of the first and third Gospels, and it should also be remembered that, like most who speak much, Jesus may often have repeated the great lessons which he wished to enforce, but a difference between the evangelists in their manner of treating their common material may also be accepted. Luke must also have had other sources of information than the two great sources which have been discussed, which would be quite in keeping with his claim (i, 3) of wide and thorough investigation. See article LUKE, GOSPEL OF.

It is now generally recognized that the «Two Document» theory gives plausible answer to most of the questions involved in the «Synoptic Problem,» and consequently scholars are resting on it with increasing unanimity and confidence. At the same time there is no such general agreement as to details in the application of the theory. (1) While the majority would say that Mark in its present form, or a document practically indistinguishable from it, was used in the composition of the first and third Gospels, yet there are such difficulties in the way of this view it has been strongly urged that the authors of Matthew and Luke must have had access to the Marcan material only in forms which had come in the process of transmission to vary widely from each other, or even, as has already been noted, that we must conceive that Mark issued his Gospel in no less than three quite variant editions. (2) It is still further asserted that the Marcan source cannot be explained wholly independently of Q, but that some traces of the latter should be recognized as existent in the former. (3) This suggests, again, the uncertainty which still prevails as to the extent of Q, and even as to its character, that is, as to whether it consisted exclusively of discourse material, or included narrative matter as well. Such uncertainty in regard to these points at least still reigns that it may perhaps be doubted whether, even if, as seems most probable, the «Two Document» theory should permanently maintain itself, it is also reasonable to expect that it will be possible, with the material which we possess, to find satisfactory answer to the questions which arise in its application. Uncertainty as to the exact form in which the sources were at hand for the composition especially of Matthew and Luke is increased by the recognition of the fact, on which emphasis has lately been freshly laid, that the authors of the Gospels were not mere copyists who felt bound exactly and without modification of form to reproduce all the material which was accessible to them, their work consisting merely in piecing it together, but that they were, rather, authors who without doing injustice to their materials, might and very possibly actually did select, arrange and even, to some extent at least, rewrite them in accordance with their own purposes. Thus, for example, the fivefold arrangement of the discourse material in Matthew might be due, not to some source which lay before him, but to the final author himself.

After the acceptance of the «Two Document» theory, question still remains as to the ultimate origin of a certain amount of material, relatively small on the whole, which seems to some to stand outside the natural scope of both Q and the Marcan source. One example is the apocalyptic discourse of Jesus, which, to be sure, is found in all the Synoptics. The criticism which separates this from the Marcan source is, however, wholly subjective and the assumption that Jesus cannot have uttered such a discourse has been fairly styled «purely gratuitous.» As to the «Infancy» chapters in Matthew and Luke the case stands quite differently and for this material special sources must be sought. It has been suggested with great plausibility that the matter in this section of Luke was obtained from the daughters of Philip the evangelist, or, even more plausibly still, from Joanna, the wife of Chuza, Herod's steward. In the latter case it may reasonably be believed that the large section of matter in Luke without parallel elsewhere (Lk. ix, 51–xviii, 14) was due to the same source.

The Relation of the Fourth Gospel to the Other Three.— Most of the difficulties connected with the fourth Gospel relate simply to the book taken by itself, and the discussion of them has no place in an article concerned only with what belongs to all the Gospels or to several of them (see article JOHN, GOSPEL OF). One important and difficult problem, however, grows out of the contrast which appears in many ways between the fourth Gospel (John) and the other three. Their unlikeness is so great that it is scarcely surprising that some have felt that they were positively inconsistent, that if the Synoptics are accepted as authentic, the unauthenticity of John must follow. But on more careful study many of the superficial unlikenesses lose their apparent significance. For example, the mention of three passovers in John and of but one in the other Gospels might seem to give an irreconcilable contradiction as to the length of the ministry of Jesus, but it is very possible that the Synoptics simply failed to mention the occurrence of passovers not connected with the events which they described, and there is good reason to hold that the ministry as recorded in those Gospels requires a duration of much more than a year. Most of the events in the active ministry of Jesus as recorded in John occurred in Judea, while the scene of the synoptic reports is laid in Galilee, but the ministry is not so reported by either as to forbid the acceptance of the other. It is needless to multiply examples. Some difficulties remain unsolved, as to find in harmony with the synoptic reports a place for the raising of Lazarus, but it is to be remembered that both sets of reports are exceedingly fragmentary and that fuller information, could we obtain it, might relieve the situation. If it is found impossible to reconcile the statements of John and the Synoptics as to the day of the crucifixion, whether the 14th or the 15th of the month (not all critics are sure that there is a clear contradiction), it remains to be settled whether the statements in John may not have been written with the definite purpose to correct the synoptic reports. While it is now recognized that «harmonizing,» i.e., the fitting together in their order of all the events recorded, is less easy and certain than was formerly thought, because of the fragmentary character of all the reports, yet the same fragmentariness makes it less easy to assert with confidence that John and the Synoptic Gospels are contradictory or even inconsistent.

Grouping of the Four Gospels.— It is plain from the prologue of Luke that there were in existence at that time various narratives in relation to Jesus which presumably had gained some currency. To say nothing of the Apocryphal Gospels, most of which are certainly much later, it appears that the so-called «Gospel of the Hebrews» and «Gospel of Peter» found considerable acceptance for some time. Gradually, however, these other narratives were set aside in favor of the present fourfold gospel. This can scarcely have taken place in the 1st century, for John cannot have been composed till nearly the end of the century. But by the middle of the 2d century the «Diatessaron» of Tatian, a single narrative formed by combining the four which we now have, shows that the grouping was already a fact, and by implication that it had been accomplished long enough so that it was a familiar and accepted fact. The testimony of Papias shows that long before the middle of the century this process was taking place in Asia Minor, if it had not been already accomplished. This fact may be sufficient to justify that it was in Asia Minor and perhaps in Ephesus itself whither the first three gospels had been carried and where the fourth was written, that there came about this grouping of narratives which has given to the Christian Church its permanently fourfold gospel. While the accepted group of gospels has always consisted of the same four books, it is interesting to note that the order in which the books stand in the MSS. varies greatly. Almost every possible order of books is to be found, and the order, Matthew, John, Luke, Mark, is found only less often than the order which finally prevailed.

Historicity of the Gospels.— Very positive assertions were formerly often to be met with as to the unhistorical character of the Gospels, and every variation in statement was urged as a proof of their untrustworthiness. But later and more careful criticism shows that the authors were honestly trying to set forth facts as they knew them, and the discovery of the sources which underlie them increases their trustworthiness. Not only have the commonly accepted dates of the Synoptics been pushed back to points far earlier than the dates proposed by older scholars, but the sources carry us back much earlier still. The «Marcan Source» and the «Logia» cannot be separated by 30 years from the events which they record, and may not be more than 15 or 20 years from them. This fact makes the growth of myth and legend practically impossible, and shows that many eye-witnesses of the ministry of Jesus were still living at the time of the composition of the «sources,» on which the historicity of the Synoptic Gospels largely, but by no means exclusively, depends. That our Gospels embody so fully and exactly these early sources goes far to guarantee their trustworthiness.

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GOSS, Charles Frederic, American Presbyterian clergyman: b. Meridian, N. Y., 14 June 1852. He was graduated from Hamilton College in 1873, from the Auburn Theological Seminary in 1876 and was at first a home missionary and besides briefer settlements was pastor of «The Moody Church» in Chicago for five years and the Avondale Presbyterian Church in Cincinnati for 19 years, retiring in 1913. He received his D.D. from his alma mater; was instructor of biblical literature in the Cincinnati university; minister in residence in Auburn Theological Seminary in 1912; lectured extensively; wrote for many papers and published 'The Optimist'; 'The Philopolist' (1898); 'The Redemption of David Corson' (1900); 'The Loom of Life' (1902); 'Little Saint Sunshine' (1902); 'Hits and Misses' (1899); 'Just a Minute' (1904); 'A Life of D. L. Moody', and a 'History of Cincinnati' (1912).

GOSS, Isham J. M., American eclectic physician and author: b. Oglethorpe County, Ga., 16 Aug. 1819; d. Marietta, Ga., 25 Feb. 1896. He was graduated at Emory College, Ga., and in 1844 in medicine from the medical department of the University of Georgia. For 14 years he followed the practice of the regular or allopathic profession, when he was converted to American Eclecticism and became a leader of that school in the South. Several eclectic colleges conferred upon him the honorary degree of doctor of medicine. In 1868 he filled the chair of practice in the Philadelphia Medical University and in 1877 the chair of materia medica and therapeutics in the Georgia Eclectic Medical College, reorganized that year. He wrote 'Materia Medica' (1877); and 'Theory and Practice of Medicine' (1882).

GOSS, Warren Lee, American writer: b. Brewster, Mass., 19 Aug. 1835. He studied at the Harvard Law School, served in the Civil War, first in the United States engineers and later in the 2d Massachusetts Volunteers; was president and later historian of the National Union of ex-Prisoners of War; was for two years national patriotic instructor of the Grand Army of the Republic. He has been active as editor, magazine writer and author of such volumes as 'The Soldier's Story of Captivity at Andersonville' (1866); 'Recollections of a Private' (1890, the first seven chapters previously published in the *Century Magazine*), and several such volumes as 'Jed, a Boy's Adventures in the Army,' and later, 'Life of Grant for Boys and Girls' (1911), and 'Boy's Life of General Sheridan' (1913).

GOSSAN. See Secondary Enrichment.

GOSSE, gŏs, **Edmund William,** English literary critic and poet: b. London, 21 Sept. 1849. From 1875–1904 he was translator to the Board of Trade, and since 1904 has been librarian to the House of Lords. In 1884–85 he lectured in the United States. He has made a special study of Scandinavian literature, and published 'Studies in the Literature of Northern Europe' (1879). Other works of his are 'Life of Gray' (1882); 'Seventeenth Century Studies' (1883); 'From Shakespeare to Pope' (1885); 'Life of Congreve' (1888); 'History of Eighteenth Century Literature' (1890); 'Life of Philip Henry Gosse, Naturalist' (1890); 'Gossip in a Library' (1891); 'Questions at Issue' (1893); 'The Jacobean Poets' (1894); 'History of Modern English Literature' (1897); 'Coventry Patmore' (1904); 'Father and Son' (1907), a delightful piece of autobiography which was crowned by the French Academy in 1913; 'Portraits and Studies' (1912); 'Collected Essays' (5 vols., 1913). He published his 'Collected Poems' in 1896.

GOSSELIN, gōs-lăṅ', **Auguste Honoré,** French Canadian historian: b. Saint Charles de Bellechasse, province of Quebec, 29 Dec. 1843. He was educated at Quebec Seminary and Laval University, was ordained to the priesthood in 1866, and has held various clerical appointments. He is the author of 'La Vie de Mgr. de Laval' (1890); 'Les Normands an Canada' (1892–94); 'Mgr. de St. Valier et Son Temps' (1900); 'Jean Nicolet et le Canada de Son Temps' (1905).

GOSSEN, gōs'sĕn, **Herman Heinrich,** German economist: b. Düren, 1810; d. 1858. His father and grandfather were government officials, and he followed the same career, with a want of success which is attributed to his predilection for abstract studies. He is described as amiable and unpractical. He retired into private life in 1847, occupying himself first with a project of universal insurance, afterward with his book entitled 'Entwickelung der Gesetze des menschlichen Verkehrs und der darausfliessenden Regeln für menschliches Handeln' (Brunswick 1854). This work which had been generally overlooked even in Germany, and is not mentioned in Roscher's 'History,' was brought to light by Professor Adamson, and an account of it was given by Jevons in the preface to the second edition of his 'Theory of Political Economy.' It was extremely rare and was reprinted at Berlin in 1889. The work is an attempt to found economics on a mathematical basis, and the author regarded his services in the reform of the method of the science as similar to those of Copernicus in astronomy. Gossen's book contains two elements of unequal value; a somewhat narrow and pedantic application of utilitarian philosophy to politics and ethics, and a very original formulation of the principle of final utility in economics. In general it may be said that Gossen is guilty of a fallacy to which mathematical economists are peculiarly liable; what may be called the «illicit process» from the principle of utility in economics to utilitarianism in the philosophy of conduct. Gossen's strength lay only in the more mechanical portions of the mathematical theory. He was a man of one idea; but that was an immortal one. Consult *Journal des Économistes* (4th ser., Vol. XXX, 1885, p. 68); Walras, Léon, 'Un Economiste Inconnu.'

GOSSYPIUM. See COTTON.

GOSSYPIUM PHOSPHO, a valuable fertilizer composed of a mixture of cottonseed meal and pulverized phosphate rock. The making of this fertilizer is an important industry in the South, where one factory has an output of 15,000 tons annually. The phosphate rock, which comes from South Carolina, passes through huge mills of great power, and is ground into a fine powder, after which it is carried through draft pipes to the top of a six-story tower, and there undergoes a process of refinement. The rich yellow meal which comes from the cotton-seed oil-mills is mixed with the ground phosphate, and adds materially to its strength as a fertilizer. The mixture thus obtained is collected into immense bins, and treated with sulphuric acid, assuming a semi-liquid state. It is then called gossypium phospho.

GÖSTA BERLING, yĕs'tą bār'liṅg, **The Story of,** a novel by Selma Lagerlöf, appeared about Christmas-time 1891. In the summer of 1890 a Swedish magazine, the *Idun,* had offered a prize for the best novel of a certain length. Selma Lagerlöf entered the contest with a few chapters from 'Gösta Berling,' a story which was then beginning to take shape in her mind, and won the prize. In 'The Story of Gösta Berling' Selma Lagerlöf is a romanticist and represents a reaction against the realism which prevailed at the time. As a child she had absorbed the folk-tales of her surroundings, and later on in life it occurred to her like a lightning flash that it was her particular mission to give these stories expression. 'The Story of Gösta Berling' has been called the «prose epic of Swedish country life.» The scene is laid on the shores of Lake Fryken (Lake Löven in the story) in Värmland. The hero, Gösta Berling, is a deposed minister, who has been saved by the mistress of Ekeby from freezing to death and thereupon becomes one of her pensioners in the manor at Ekeby. As the pensioners finally get power in their own hands, they manage the property as they themselves see fit and their lives are filled with many wild adventures. Gösta Berling is the leading spirit, the poet, the charming personality among a band of revelers. But before the story ends, Gösta Berling is redeemed, and even the old mistress of Ekeby is permitted to come to her old home to die. In 'The Story of Gösta Berling,' as in her other works, the authoress shows a marvelous simplicity of style. Everything she touches quickens with new life and takes on a deeper meaning. Her imagination and her idealism lend a charm to the story which makes it a source of keen enjoyment.

JOSEPH ALEXIS.

GOTHA, Almanach de. See ALMANAC.

GOTHAM, a parish of Nottinghamshire, England, seven miles southwest of Nottingham. Pop. (1911) 1,086. The people obtained a reputation for stupidity and simplicity, and the satirical appellation of «the wise men of Gotham,» owing to the tradition that King John journeyed through the town for the purpose of selecting a site for a palace, and the inhabitants, not wishing to be burdened with the expenses of a royal residence, devised the plan of appearing stupid and foolish during the visit of his majesty. King John left in disgust; whereupon the Gothamites said: "More fools pass through than live in Gotham." The name Gotham is applied also to the city of New York. Thus used it appeared first in 'Salmagundi,' by Washington Irving and James K. Paulding. The authors may have had in mind the worldly wisdom of the city's inhabitants.

GOTHENBURG (gŏt'ĕn-boorg) **SYSTEM,** a system of regulating the sale of spirituous liquors which had its origin in 1865, in Gothenburg, Sweden. A company is granted a monopoly of the retail and bar sale of those liquors in the town (brandy is the national drink); but the sale of beer and wine is not included in the monopoly. Managers at fixed salaries are placed in the public houses, part of whose duty it is to provide food at cheap rates and who get the profits realized on soft drinks. After paying dividends to the shareholders (not exceeding 6 per cent) the additional profits are divided between the municipality and the central government. In Norway the profits above 5 per cent are applied chiefly to a national fund and to objects of public utility other than those supported out of the rates. In addition to a number of towns in Sweden, Norway and Finland, it has been introduced in certain towns and districts in Scotland and England. In the places where the system has been tried it has been successful in limiting the consumption and in lessening the number of licenses; it has tended to ensure the sale of purer liquors; it has divorced politics from liquor and eliminated the element of private profit; but the temptation to increase revenue has in some places not promoted temperance, and the association of the municipality with liquor has made the system obnoxious to the great body of temperance opinion.

A modified Gothenburg licensing system was introduced into South Carolina in 1892, when the sale of liquor became a State monopoly and its retail was placed in the hands of salaried dispensers. The system led to intense dissatisfaction; charges of corruption were leveled at its administration; and in 1907 it was abandoned. Consult Gordon, 'The Breakdown of the Gothenburg System' (New York 1911); Gould, E. R. L., 'The Gothenburg System of Liquor Licensing' (Washington 1893); Pratt, 'Licensing and Temperance in Sweden, Norway and Denmark' (London 1907); Rowntree and Sherwell, 'Gothenburg Experiments and Public House Trusts' (London 1901).

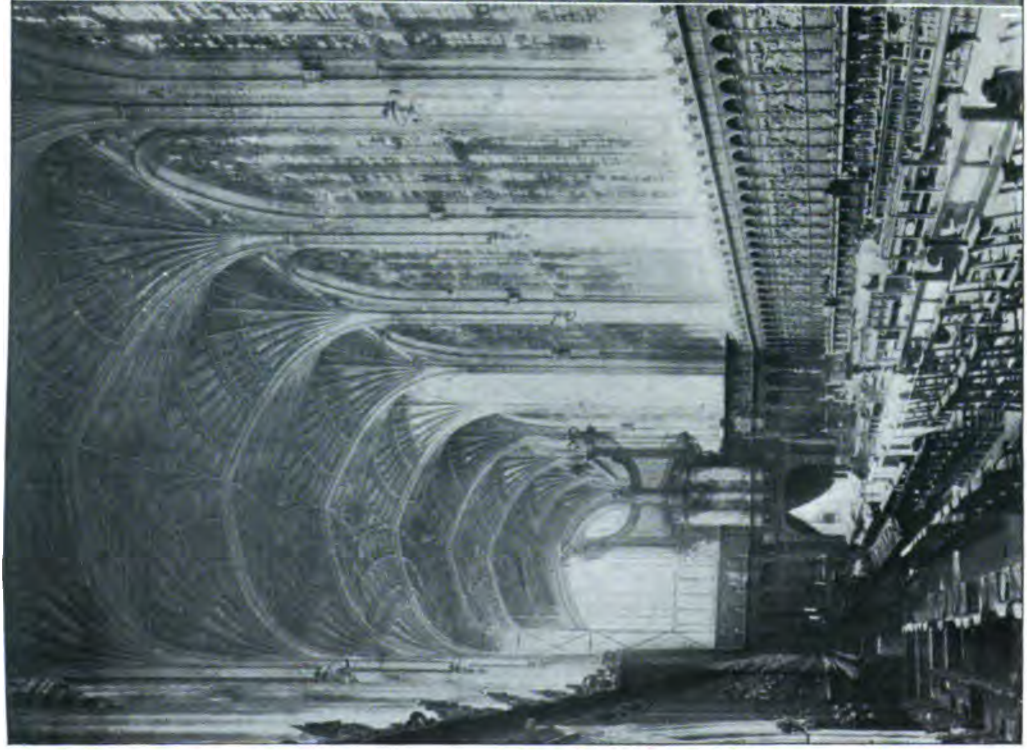
GOTHIA, the empire of the Visigoths, or Western Goths, which extended over Spain and included Septimania, territory held in Provence; Gaul, and the cities of Carcasonne, Narbonne and Nimes. See Goths; Visigoths.

GOTHIC ARCHITECTURE. The name "Gothic" applied to a style of architecture is a misnomer, since the Goths never created any architecture of their own. It has, however, come into general use to designate comprehensively the mediæval architecture of northern and western Europe of the period from 1150 to 1500, because in the 16th century the Renaissance writers and artists looked upon all mediæval architecture as "barbarous" because different from antique classical models, and attributed its origin to the Goths who overran large areas in Europe in the "Dark Ages." The name thus became too firmly fixed to be displaced, in spite of its unscientific origin.

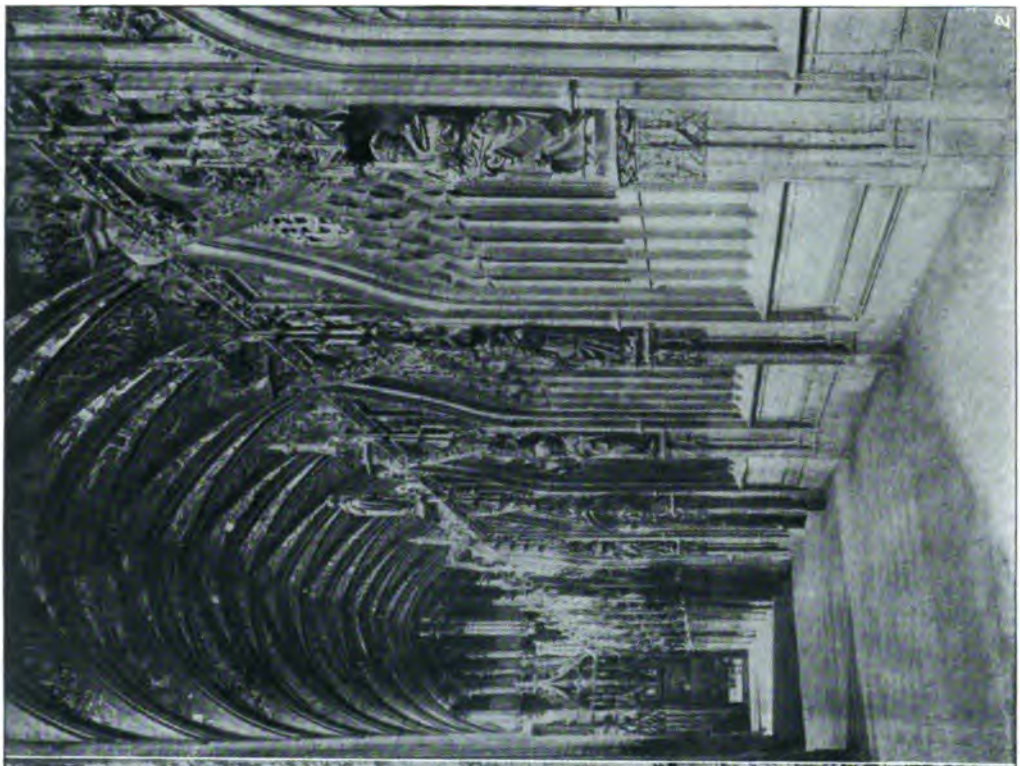
Definition.— While some writers deny that any one name can properly be applied to so vast a body of architecture as is commonly included under the name of Gothic, the following definition of the term is sufficiently comprehensive to cover the styles to which it is commonly applied and sufficiently specific to exclude all others: Gothic architecture is that style which grew up in northern and western Europe, from germinant principles previously developed in the so-called Romanesque styles, taking on new forms and extended applications in progressive solutions of the problem of the construction and decoration of church edifices vaulted throughout in stone, especially of churches having three or five aisles whereof the central one was loftier than the others and was lighted by a clearstory. The style thus developed, first of all and to the highest perfection in northern France, was varied in the several countries to which it spread, and its forms were applied to a great variety of buildings, both religious and secular. Its fundamental structural principles were the employment of ribbed groined vaults to cover the several aisles, the concentration of loads and thrusts at particular points, and the special disposition of masonry at those points to support the loads and resist the thrusts, with a corresponding reduction of the massiveness of walls elsewhere. The controlling principle of the design was the frank expression everywhere of the actual structural framework. The decoration was of two kinds: first, the adornment of the structural members by moldings and carving; secondly, pictorial, didactic and symbolic adornment by means of sculpture, stained glass and painting. Applied ornament in stucco, marble sheathing and mosaic is wholly wanting, except in Italy. The characteristic features developed in this architecture were the ribbed vault, the flying arch, buttress and pinnacle, the pointed arch, clustered piers, traceried windows and towers with spires. As the style spread to regions where timber was abundant, scientifically designed ceiling-roofs of wood were often substituted for stone vaults, and in other regions brick was used for walls and vaults instead of stone; but even in these the concentration of strains, the frank expression of the structure and the employment of the characteristic forms and decoration of the style justify their inclusion under the general name of Gothic.

Historic Development.— By the middle of the 12th century the monastic builders of northern France had developed the ribbed groined vault, of both the four-part and six-part type (see Vaulting) sufficiently to enable them to vault successfully the high, broad central aisles of a remarkable series of large and lofty churches with clearstories; they had begun to use the pointed arch with increasing frequency, and the flying arch and buttress, in a somewhat crude form, had appeared in a number of churches. But the masonry was still massive, the windows small, and the dead weight of the structure throughout was the main reliance for its stability. What distinguishes the early Gothic buildings is the systematic effort to

GOTHIC ARCHITECTURE

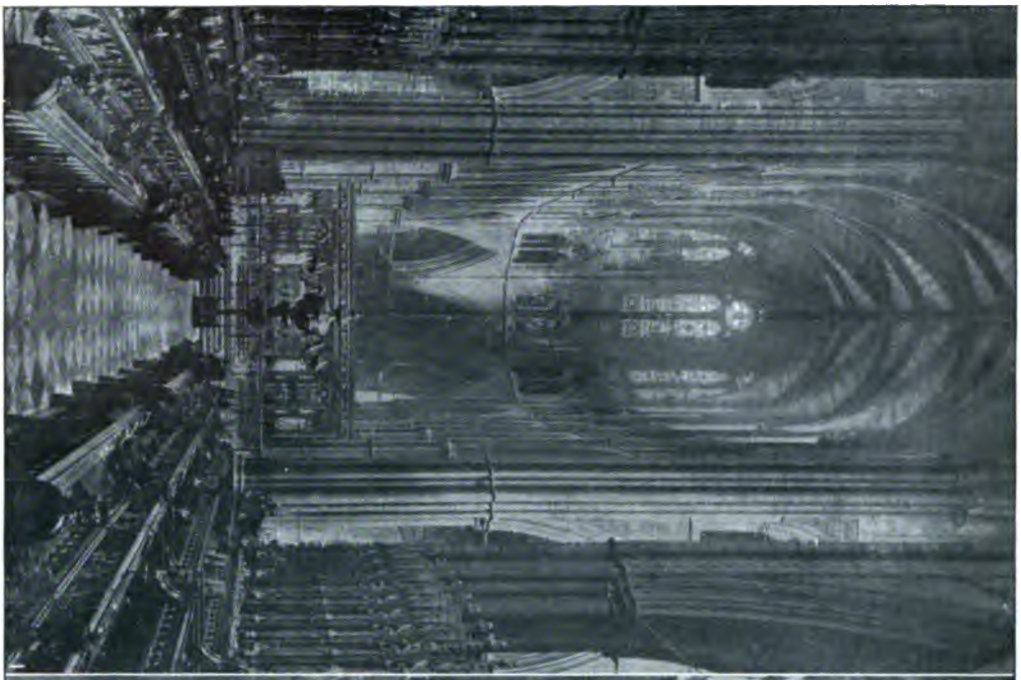


1 King's College Chapel, Cambridge

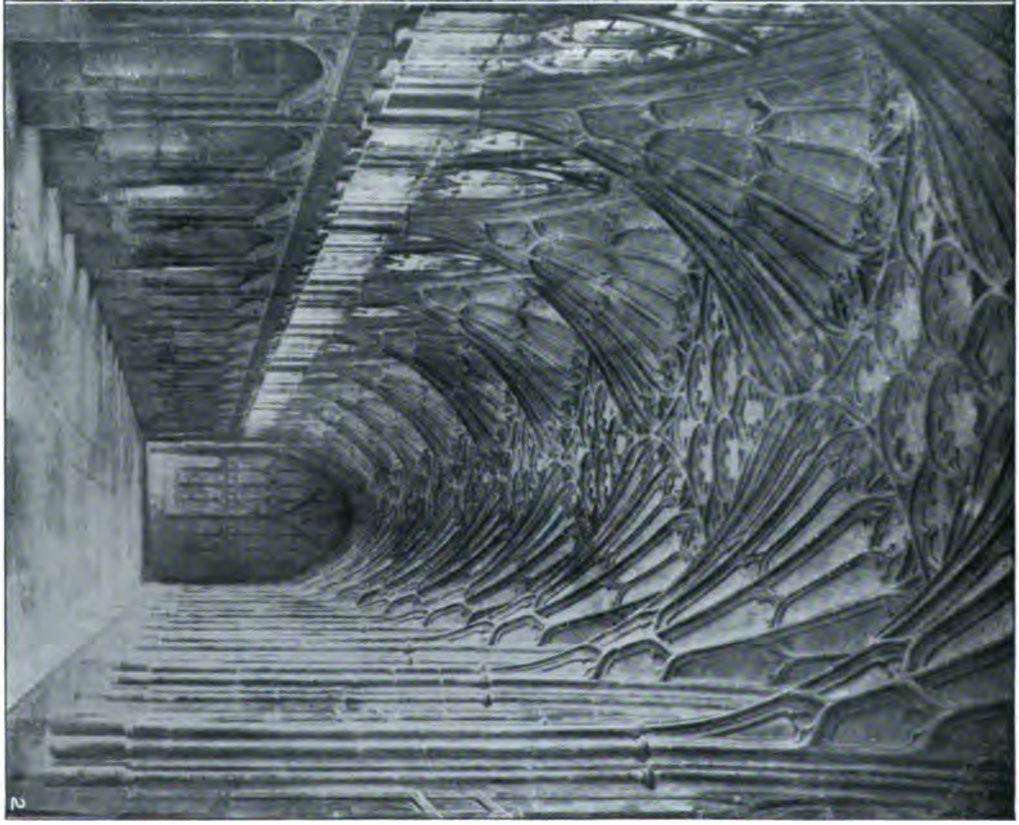


2 Side Screen of Choir, Albi Cathedral

GOTHIC ARCHITECTURE



1 Westminster Abbey. Chancel



2 Gloucester Cathedral. Cloister

divide the loads from the thrusts, and to concentrate the resistance to the latter in deep buttresses against the outside walls, transmitting the vault-thrusts to these by flying half-arches across the intervening aisle-roofs. The clearstory walls and the piers and arches carrying them could then be made much lighter, and the side-aisle walls between the buttresses reduced to mere screen walls. This lightening of the walls was greatly helped by increasing the size of the windows, which increase was further stimulated by the development of stained glass, and tracery was devised in order to divide these larger windows into narrower windows or «lights,» because wide areas of stained glass are impracticable and unsafe. In this scientific development of structural lightness the pointed arch was found to be the most flexible and adaptable form, and soon displaced completely the round arch, while the greater lightness of construction without loss of stability made possible a marked increase of height. Accompanying all this progress in what may be called the engineering of church building there was at least an equal advance in artistic taste, in elegance of execution, in refinement of detail, in decoration by figure-sculpture, ornamental carving and stained glass, and in the design of the tracery of the great window-openings. In the carving the classic and Byzantine traditions of the Romanesque period were rapidly outgrown; suggestions of ornamental form were drawn from nature, especially from the foliage of common plants, and religious symbolism added a world of new conceptions in carved stone, in which beasts, birds, human figures, monsters and grotesques, ingeniously and often humorously worked into capitals, corbels, moldings and other details, served at once an allegorical and decorative purpose. The portals of churches were made deep and vast and peopled with saints, angels, apostles and martyrs, and the windows glowed with brilliant pictures of Biblical scenes and religious allegories. This transformation of ecclesiastical architecture was effected mainly in the building of great cathedral churches. During the second half of the 12th century the French bishops acquired much of the power and prestige previously held by the abbots of the great Benedictine monasteries, and attracted to their aid the people especially of the episcopal cities, where the new cathedrals arose, not merely as bishops' churches but also as civic enterprises, as great peoples' churches, rivaling and surpassing even such noble abbeys as that of Saint Denis. Between 1130 and 1200 the cathedrals of Bayeux, Bayonne, Laon, Lisieux, Noyon, Poitiers, Senlis and Soissons were entirely rebuilt, or their rebuilding begun; while wholly new cathedrals were begun at Bourges, Chartres, Paris and Tours. During the following half century the great cathedrals of Amiens, Auxerre, Coutances, Evreux, Reims and Rouen were begun, besides many fine parish churches and royal chapels like the exquisite Sainte Chapelle at Paris. As the style developed it was applied to a great variety of buildings; it advanced in decorative richness, but slowly declined in power with the diminished demand for new cathedrals, of which only one, that at Albi, was erected in the 14th century. Chapels, parish churches like Saint Ouen and Saint Maclou at Rouen, were erected in the later phase of the style, called from the flame-like curves of its tracery «Flamboyant,» and earlier buildings were partly remodeled in the same period, like the choir of the Abbey of Mont Saint Michel, the façade of Rouen, and the transept fronts of Beauvais.

The perfected type of French Gothic cathedral, as exemplified at Amiens, for example, has a three-aisled nave, short transepts, a five-aisled choir with ambulatory and radiating apsidal chapels, and shows structurally a skeleton of supporting piers, arches and vaults with a series of deep buttresses capped by pinnacles and connected to the wall-buttresses of the clearstory by flying arches. The spaces between these members are filled by light walls and huge traceried windows. The church is some 400 feet long and from 100 to 140 feet high within to the top of the vault. The masonry, moldings, sculpture and carving are admirable in design and workmanship; the effect upon the spectator is one of extraordinary dignity, solemnity and power, eloquent of the religious fervor which created it.

Spread of the style.— The earliest spread of the style beyond France was across the Channel to England, of which French Normandy was in 1174 a province, and the first work to show the French Gothic influence was the choir of Canterbury cathedral, rebuilt after the fire of 1174 by a William from Sens, and completed after his death by an English William. In this work round arches and pointed arches, round piers and clustered piers, Norman and Gothic details are found associated together, but the predominant character is Gothic. Lincoln Cathedral was the first to be built throughout in the Gothic style, though parts of the Norman façade of an earlier edifice were retained. Wells, begun a little earlier but slower in building, and Lichfield a little later, Salisbury, built throughout between 1225 and 1258 (except the central tower and spire); Beverley, York, Southwell and Glasgow cathedrals and Westminster Abbey, all begun between 1225 and 1250, are among the most important examples in which the English Gothic style reigns throughout. But in addition one must note the great number of Anglo-Norman abbeys and cathedrals which were partly rebuilt in the more modern style like Hereford, Rochester, Gloucester and Ely cathedrals, having Norman naves (the first three with Gothic vaulting) and Gothic choirs; Peterboro, with a Gothic west front, Norman nave and choir and Gothic retro-choir, and many others. In the 14th century the Norman naves of Canterbury and Winchester were rebuilt in the advanced Gothic style then prevailing. This later phase is called the Perpendicular, from the character of its window-tracery. Like the Flamboyant in France it appears chiefly in partial remodelings of earlier buildings, in parish churches and in large chapels, of which three are especially notable: Saint George's chapel at Windsor, King's College chapel at Cambridge and Henry the Seventh's chapel at Westminster.

The English Gothic differs from the French in its greater massiveness and in exhibiting less of the French structural logic and structural loftiness. On the other hand, the decorative element is more conspicuous, especially in the interior treatment. The English multiplied their vaulting-ribs and developed superbly decorative forms of vaulting, culminating in the fan-vaulting of the later churches. (See VAULTING). They also developed the Norman crossing-lantern into a splendid type of square central tower (Lincoln, Canterbury) sometimes with a spire (Salisbury). The deep French portals rich with sculpture are wanting; the doors are small, the west fronts picturesque rather than logically expressive. The French apse with radial chapels is found only in Westminster Abbey; most of the great churches have square East ends, after the Cistercian tradition. The English wooden ceiling on hammer-beam trussses, seen in many parish churches and in Westminster Hall, was an application of Gothic principles to a construction in timber. English tracery is remarkably beautiful and varied.

The style spread in the 13th century to Germany, but developed slowly, with less of consistency than in England. The plans are very varied; the apse surrounded by radial chapels is found in perfection only at Cologne (1248), and while there and at Regensburg and a few other places the French influence was strong, in other examples the details of the Gothic style were applied in a more or less capricious manner, as at Freiburg, Ulm, Oppenheim, Halberstadt, Marburg, etc. Strassburg and Metz are predominantly French. The Germans developed the traceried spire and the «hall-church,» with aisles of equal height, as their most characteristic contributions to the style.

In Italy, Gothic principles of structural logic were never accepted; the Gothic details were applied as an ornamental dress to buildings of the most varied construction. A few «Gothic» churches were built by foreigners early in the 13th century (Assisi, Vercelli); others later in the century by Italians (Sta. Maria Novella at Florence, the Frari and Saint John and Saint Paul at Venice; Sienna Cathedral and the façade of Ovieto); but the majority of the Gothic work in Italy dates from the 14th century and early 15th. Santa Croce and the great cathedral at Florence were begun about 1296; the Certosa at Pavia, San Petronio at Bologna and Milan Cathedral, nearly a century later. In all these except Milan, flying buttresses are avoided; on the other hand, colored marble, inlays, mosaic and internal painting of the most splendid character were freely used. The secular Gothic style of Venice, seen in the Doge's palace and other palaces, was a remarkably original and effective local development.

Lack of space forbids here any account of the ecclesiastical Gothic architecture of Belgium and the Netherlands or of Spain, for which the inquirer is referred to the general histories of architecture and to works and articles on these countries.

Secular Monuments.— The style thus developed in ecclesiastical edifices was applied also in the design of such secular buildings as were needed, such as town halls, «palaces of justice,» hospitals, guild halls and the like. The city republics of Italy were the first to create distinctive types of secular Gothic architecture, because of their strong civic independence. The Bargello and Palazzo Vecchio of Florence and the Palazzo Pubblico of Siena date from the latter part of the 13th century; the Doge's Palace at Venice from the 14th and 15th. In France, England, Germany and Belgium civic independence was slower in asserting itself architecturally; the French Gothic town halls (as at Compiègne) and palaces of justice (as at Rouen) belong mostly to the 15th and early 16th century; but there are city gates and civic towers of earlier date in many French towns. It was in the Netherlands, especially in what is now Belgium and French Flanders, that civic architecture was most brilliant, especially in the latter part of the 15th and early 16th century, as exemplified in the town halls of Arras, Audenarde, Bruges, Brussels, Ghent and Louvain, and in some of the guild houses of various cities.

Domestic architecture was at first of minor importance. The homes of the great feudal lords were fortified castles (see MILITARY ARCHITECTURE); those of the commoners mostly small and insignificant houses on crowded streets. The 14th century witnessed a great progressive change; palaces gradually replaced the castles, and in the cities especially they were often of great elegance (as in the house of Jacques Coeur at Bourges and the Hotel Cluny at Paris, both of the 15th century) in France, and in many examples in Italy, especially in Venice (Foscari Palace, Ca'd'Oro, etc.). In these later Gothic palaces the resources of the florid late Gothic style were freely employed, with many modifications (e.g., dormer windows in France, stepped gables in Germany and the Netherlands) to adapt them to their new functions. In England the finest secular works of the late Gothic period were the colleges and halls of the great universities, and the manor houses or country palaces of lords and gentry under the Tudor monarchs.

The Modern Gothic.— During the two middle quarters of the 19th century there was a widespread effort in Western Europe to revive the use of Gothic forms in modern architecture; a movement especially strong in England, which produced not only many interesting churches but also a large number of town halls, courthouses, etc., in free versions and adaptations of the historic Gothic style (Town Hall and Assize Courts at Manchester, the fine Houses of Parliament in London, the far less successful Law Courts in the same city, etc.). The movement spread, though feebly, to the United States, appearing chiefly in churches, of which a few — Trinity and Grace churches and the Roman Catholic cathedral at New York among others— are creditable and interesting works. With the eclecticism of the 20th century in America the details of the style have been applied to commercial buildings, as in the Woolworth building at New York, and the English collegiate Gothic very successfully employed in college and university buildings at New York, Princeton (N. J.), Chicago, Saint Louis, Bryn Mawr and other places. See ARCHITECTURE, MODERN.

Bibliography.— From the vast literature of Gothic architecture only a few titles can be given. For the general discussion: Cram, R. A., 'The Substance of Gothic' (Boston 1917); Gonse, L., 'L'Art gothique' (Paris, n. d.); Jackson, T. G., 'Gothic Architecture' (Cambridge 1915); Moore, C. H., 'Development and Character of Gothic Architecture' (New York 1899); Viollet-le-Duc, E., 'Dictionnaire raisonné,' etc. (Paris 1876). For French Gothic: Enlart, C., 'Manuel d'archéologie française’ (Paris 1902), also Gonse, Moore and Viollet-le-Duc as above. For England: Bond, F., ‘Cathedrals of England and Wales’ (London 1912), and ‘Introduction to English Church Architecture’ (ib., 1913); Moore, C. H., ‘Mediæval Church Architecture of England’ (New York 1912); Parker, ‘Introduction to Gothic Architecture’ (London 1866); Rickman, T., ‘An Attempt to Discriminate the Styles, etc.’ (London 1848); Scott, G., ‘Mediæval Architecture’ (ib., 1886); Van Rensselaer, M. G., ‘English Cathedrals’ (New York 1893). For Germany: Foerster, ‘Denkmale deutscher Baukunst’ (Leipzig 1855–69); Hasak, ‘Die romanische und die gothische Baukunst’ (Stuttgart 1902); Lübke, W., ‘Ecclesiastical Architecture in Germany,’ etc. (London). For Italy: Cummings, C. A., ‘A History of Architecture in Italy’ (Boston 1901); Street, G. E., ‘Brick and Marble Architecture of Italy’ (London 1872). For Spain: Gade, J. A., ‘Cathedrals of Spain’ (New York 1911); Lamperez y Romea, V., ‘Historia de la arquitectura cristiana Española’ (Madrid 1909); Street, G. E., revised by King, A. G., ‘Gothic Architecture in Spain’ (New York 1914). For Belgium and Holland: Klock, L., ‘Architecktur der Niederlande’ (Leipzig 1894); Narjoux, F., ‘Notes and Sketches of an Architect’ (Boston 1877); Schayes, A. G. B., ‘Histoire de l’architecture en Belgique’ (Brussels 1850).

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GOTHIC ART. The art of the times and the countries in which Gothic architecture flourished. The term is a misnomer, because even if the architectural style were rightly designated "Gothic," the wall-paintings, metal work, etc., of the time are not properly so described. Still no other term exists for those arts which prevailed in Europe from 1150 to the beginning of the Risorgimento in Italy (about 1375), and in the North until the decided beginning of the Renaissance (about 1500). There are certain arts of decoration which flourished in a wonderful way during this period, while others attained little excellence. Thus the pottery of the north of Europe and even of Italy during the period named has never attracted much interest in modern times; very few examples of it remain, and what little there is that is effective in an artistic sense is decidedly Oriental (Saracen and Moslem) in character. Glass, too, is of little interest except in connection with windows, and apparently few glass vessels were made during the Middle Ages. On the other hand, metal-work was of singular interest. Bronze was not as common as it has always been in the East and as it was to be in Europe at a later period, but wrought iron reached a splendid development in the gratings, gates, window-bars, etc., of buildings, and in the singular enclosures made for tombs. Brass was cast in large sheets and hammered smooth and then engraved with arms and legends befitting the burial slab of a knight or noble lady; silversmiths’ work was carried to a high pitch of excellence, and the common use of colored enamels applied to both bronze and to silver made the ecclesiastical implements and sacred vessels of the time extremely rich. Toward the close of the Middle Ages the complete plate armor of the nobles received a splendid decoration by means of reliefs and embossings, and by gilding in patterns and etching with acid. Very beautiful stuffs were hardly ever woven in Europe during this period; for splendid weaves France, Germany and England sought the East; but the cloths and linens of the time were good and the common use of embroidery made the costume of the wealthy very splendid. The beauty of the costume, both in color and in form, affected the sculpture of the time; for, as the nude was hardly ever represented, the drapery of the figures became the chief object, with expression of face and gesture, of the architectural sculptors of the day. Both form and color were used freely in the beautiful ivory carvings which were richly painted and gilded.

Sculpture in connection with architecture is treated above. In the semi-architectural conditions of tombs and cenotaphs, life-size statues, usually recumbent, are found as early as the 13th century. These are of marble and other stone; and it is quite well ascertained that great numbers of statues in hammered bronze richly decorated with enamels existed at one time in the churches of western Europe; these also being of life-size for the most part. The raised chest or what seems the sarcophagus, the huge stone box which gives the name of altar-tomb to these monuments, often had its sides pierced with niches, and these occupied by statuettes of religious or symbolical meaning, often of great beauty. The carvings of decorative objects are of great variety, such as mirror backs and boxes to contain small mirrors, panels of book covers and statuettes of sacred subjects, sometimes 15 inches or more in height, in addition to elaborate bases upon which they stand.

Painting in the highest sense of the word, that is, the representation of human life and human sentiment, was used with reserve because it had to be applied either to the walls of the church and the palace, or to the vellum pages of a manuscript book. On this account we hardly think of the paintings of the Middle Ages as having led up to that of modern times: we think rather as the origin of modern work of the painting of the 14th century Italians, who themselves derived much of their art directly from Constantinople. Still there was a great skill showing itself in those two ways and the comparatively few remains which exist in France and Germany of the paintings on walls and vaults during the years before 1500 are worthy to be compared with the splendid miniatures in the manuscripts. These last are not always religious; some manuscripts were of history and poetry and the illustrations given to those books were in keeping with their subject. There had been a great destruction of these splendid manuscripts, but many remain in public and private collections, and modern books have been devoted to their study and to the reproduction of their finest paintings. The special achievement in the art of decoration was in the brilliant windows of the time, but for this subject see Glass; also Gothic Architecture and Window.

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Russell Sturgis,
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GOTHIC LANGUAGE AND LITERATURE. The language of the Goths is the oldest member of the Teutonic branch of the Indo-European family. It is known through a Visigothic Bible translation of the 4th century A.D. The earliest historical indications concerning the home of the Goths place them along the lower course of the Vistula in modern Poland and Prussia between Warsaw and Dantzic. Here they remained as late as 150 A.D., but early in the following century, having been dislodged probably by the movements of their Hunnish neighbors, they appeared to the north of the lower Danube and on the northwestern shore of the Black Sea in modern Rumania and southwestern Russia as far east as Odessa. To the west on the Danube were the Visigoths; to the east, in southwestern Russia, the Ostrogoths. In 251 they defeated the Emperor Decius at Philippopolis, but in 270, after various incursions into Thrace and Greece, were driven back to their seat north of the Danube. They were known to the ancient historians and geographers as Gotones or Gothones, and later as Gothi, which points to the native name Gutans or Gutos.

The only extant monuments of the language are: (1) Portions of a Bible translation, of a paraphrasing interpretation of the Gospel of John, and of a calendar contained in fragments of manuscripts written in Italy in the 6th century, presumably by Ostrogoths and known as the *Codex Argenteus.* (2) The signatures of Gothic witnesses on two Latin records or receipts, one at Naples, one formerly at Arezzo; the originals of which are now lost. A few Gothic words and names of alphabetic symbols in a Salzburg MS. now at Vienna. (3) A few Gothic words in a Latin epigram, a large number of proper names from Greek and Latin sources, and in old Spanish documents and inscriptions. (4) The scanty records of a Gothic language, probably Ostrogothic, preserved as late as the 16th century in the Crimea. The Bible translation, of which there remain portions of Matthew, Mark, Luke, John, Romans, 1 and 2 Corinthians, Galatians, Ephesians, Philippians, Colossians, 1 and 2 Thessalonians, 1 and 2 Timothy, Titus, Philemon, Esdras, Nehemiah, is associated always with the name Ulfilar or Ulfilas. He was probably himself a Goth, born about 310 A.D., made bishop of the Goths 341, removed 348, with a large body of his followers avoiding persecution, into Mœsia, south of the Danube; died 380 or 381. Ulfilas not only did the work of translation, but he invented an alphabet for it, using as a basis the Greek uncial alphabet of his time with preservation of its order, as well as of the numerical and phonetic values of the letters. He adopted it, however, to its purpose by the use of forms taken from the Latin and Runic alphabets, creating a system better for the purpose than either of the three.

The inflexion of nouns is distinguished by its relatively close approach to the original Indo-European system. In its inflection and phonology it is the most primitive of the Germanic languages. Of the cases it preserves nominative, vocative, genitive, accusative and dative, the latter including the original instrumental and locative, and to some extent the ablative.

Consult Balg, ‘Comparative Glossary of the Gothic Language’ (Maryville, Wis., 1887–89); Skeat, ‘Mæso-Gothic Glossary’ (London 1868); Wright, A. J., ‘A Primer of the Gothic Language’ (Oxford 1899).

GOTHIC TAPESTRIES. See TAPESTRIES.

GOTHS, an ancient Teutonic tribe, whose earliest known home was the shores of the Baltic, between the Vistula and the Oder, where they were living in the 1st century after Christ. Thence they migrated in the 3d century to the regions adjoining the Black Sea. Many other tribes were incorporated with them, and by continual advances and conquests they established, under Ermenric (about 350), the great Gothic kingdom, extending from the Black Sea to the Gulf of Bothnia. This naturally brought the Goths into continual contact, on the west with the western Roman Empire, and on the east with the Eastern empire as centred at Constantinople. About the year 369 internal commotions produced the division of the great Gothic kingdom into the kingdom of the Ostrogoths (eastern Goths), on the shores of the Black Sea, from the Don to the Dnieper, and the kingdom of the Visigoths (western Goths), from the Dnieper to the Danube. About the year 375 vast multitudes of the Huns and of the Alans, which latter had been subdued by the Huns, poured out of Asia, and drove back the Ostrogoths upon the Visigoths. The Goths obtained permission from the Emperor Valens to settle in Thrace, but were driven to rebellion by the oppression of the imperial governor. In the war which ensued Valens himself was defeated and slain by them at Adrianople in 378. The Emperor Theodosius incorporated the Gothic army into his legions, and henceforth they had an important influence in the affairs of Constantinople. After many vicissitudes the Ostrogoths obtained a settlement in Pannonia and Slavonia, but not till the destruction of the kingdom of the Huns in 453. The Visigoths in process of time obtained a degree of power which excited alarm in Greece and Italy. In 369 Alaric made an irruption into Greece, laid waste the Peloponnesus, and became prefect of Illyria and king of the Visigoths. He invaded Italy about the beginning of the 5th century, and by that measure brought on the destruction of the Roman Empire, since Stilicho, the Roman general, could only obtain a victory over Alaric at Verona (in 403) by withdrawing all the Roman troops from the borders of the Rhine. Alaric himself soon returned to Italy, and sacked Rome in 409, and a second time in 410. In 552 the Goths in Italy were finally overthrown in battle and expelled from the peninsula by Narses, general of Justinian. The Visigoths succeeded in establishing a new kingdom, called Gothia, in the southern parts of Gaul and Spain, of which, toward the end of the 5th century, Provence, Languedoc and Catalonia were the principal provinces, and Toulouse the seat of government. The last king, Roderick, died in 711 in battle against the Moors after which the Goths became merged in the Spanish kingdoms. Since the time of Constantine, Christianity appears to have taken root among the Goths, whence a Gothic bishop is mentioned as present at the Council of Nicæa, 325 A.D. Their form of Christianity was Arian, like that of their protector Valens, and their bishop Ulfilas. The introduction of Christianity among these Goths, and the circumstance of their dwelling near and even among civilized subjects of the Roman Empire, greatly contributed to raising them in civilization above the other German tribes. Consult Bradley, 'The Story of the Goths' (New York 1888); 'Cambridge Mediæval History' (Vol. I, New York 1911). See Gothic Language and Literature; Ostrogoths; Septimania; Ulfilas; Visigoths.

GOTTENBURG, göt'tĕn-boorg, **GOTHENBURG,** or **GOTEBORG** (Swedish *Göteborg,* or *Götheborg;* Latin, *Gothoburgum*), Sweden, seaport, the second in the kingdom in respect to population and trade, 25 per cent of the foreign trade of the country being done here, capital of the county of the same name: situated on the Gota, five miles from its mouth, 255 miles west-southwest of Stockholm. It has a dry dock cut out of the solid rock and five miles of quayage; and the completion of the Gota Canal and also the railway facilities have greatly increased its commercial importance. Although founded in 1618, by Gustavus Adolphus, the town, in consequence of numerous fires, is quite modern — the streets are at right angles and the houses well built. It has a university attended by 2,000 students, and a library of 130,000 volumes. The manufactures include iron, steel, machinery, sail-cloth, linen and leather, and there are oil-presses, cotton-mills, dye-works and building-yards, at which a considerable number of vessels are launched; the most important industrial establishments are tobacco factories, porter breweries and sugar-refineries. The trade is very extensive, the harbor being excellent and generally free from ice. Its commercial importance dates from the Continental blockade of 1806, when it became the chief British depot in northern Europe. The chief exports are iron ores, wood, pulp, grain, dairy produce, cattle, matches and soap; the chief imports coal, iron, bacon, silk, linen, cotton goods, petroleum, machinery and implements and salt. Among social reforms the town is noted for its licensing system (see Gothenburg System). It is the seat of a United States consulate. Pop. 178,875.

GÖTTERDÄMMERUNG, gĕt"tĕr-dĕm'meroong, "the twilight, or gathering nightfall of the gods," the title of Wagner's closing opera in his Nibelungen cycle of dramas, first produced at the Bayreuth Festival 11 Aug. 1876, and in the United States at New York, 25 Jan. 1888. The subject of the opera is what is called in Scandinavian mythology the *Ragnarok,* or end of the world. This was brought about largely by the admission of Loke, the god of evil and mischief, into Asgard, the abode of the gods. It was through Loke that Balder, the bright and good god, was slain and flung down into the abodes of Hel, the goddess of death. Confusion throughout the universe is the consequence. The sun and moon are swallowed by giants; continuous winters rage without an intervening summer; the earth trembles in the throes of earthquakes. Mountains topple down with a crash; the Fenriswolf breaks its chains and fetters. The Midgard serpent writhes to get free; the ship Naglfar, built of the finger-nails of dead men, passes over the sea, filled with giants of the frost and mountain; Loke leads the hosts of Hel and bursts upon the scene. The powers of evil rush to the battlefield Vigrid, while Heimdal blows his Gjallarhorn, Odin seeks the giants for advice, the other gods as well as the heroes of Valhal arm themselves and sally forth, and the battle begins. While the fight is still raging the immortal god Surt flings light and flame over the world, and the earth, reduced to ashes, sinks beneath the watery waste. See Nibelungenlied; Ragnarok and Scandinavian Mythology.

GOTTFRIED (gŏt'frēd) **OF STRASSBURG,** German poet: probably b. Strassburg, about 1200. He was not, like most of the Minnesingers (ministrels) of his age, a noble. Besides many lays, he was the author of the great chivalric poem, 'Tristan und Isolde,' derived from a Celtic original, but possessing as much originality of character as any other German classical work. For grace, elegance and vivacity of description, richness of coloring and melody of versification, this work stands alone in old German literature. It has had a great influence on later literature and furnished the theme for one of Wagner's greatest operas. There are two good editions of this work; that of Bechstein (2 vols., Stuttgart 1881) and Golther's edition in 'Deutsche National-Litteratur,' Vol. IV (Berlin 1888). The translation into modern German by W. Hertz (2d ed., Berlin 1894) is considered the superior of all others. For Gottfried's life consult Bergemann, 'Das höfische Leben nach Gottfried von Strassburg' (Halle 1876); Heidingsfeld, M., 'Gottfried von Strassburg als Schüler Hartmanns von Aue' (Rostock 1886); Schmidt, C., 'Ist Gottfried von Strassburg Strassburger Stadtschreiber gewesen' (Strassburg 1876); Stiebeling, Karl, 'Stitistische Untersuchungen über Gottfried von Strassburg' (Leipzig 1905).

GOTTHEIL, gŏt'hīl, **Gustav,** American rabbi: b. Pinne, Posen, 28 May 1827; d. New York, 15 April 1903. He was educated at the universities of Berlin and Bonn. In 1855 he was elected assistant rabbi at the Berlin Reform Temple, and in 1861 received a call to the congregation of British Jews, Manchester, England, where he spent 13 years of effective work. In 1873 he was invited to the temple Emanu El, of New York, first as assistant to Rev. Dr. Samuel Adler, and then, on the latter's retirement, as sole rabbi. In his new field his activity rapidly developed; under his personal impetus the Emanu El Preparatory School and the Jewish Ministers' Association were founded, and continued for some years. He organized the Emanu El Sisterhood of Personal Service, which, adopted by many other congregations, has become a successful feature of communal benevolence. A favorite speaker at public gatherings, his enthusiasm, sympathy and broad culture did much to win recognition for his coreligionists. In his last years he was an ardent champion of Dr. Herzel's movement to secure a place of shelter for persecuted Jews, the latest development of the Zionistic idea. Besides contributions to magazines and reviews, his published works include a hymnbook and 'Sun and Shield,' a book of daily devotion, in both of which he drew largely from non-Jewish sources.

GOTTHEIL, Richard James Horatio, American Semitic scholar: b. Manchester, England, 13 Oct. 1862. He was graduated from Columbia in 1881, studied also at Berlin, Tübingen and Leipzig, and became professor of Semitic languages in Columbia, director of the Oriental section of the New York Public Library in 1896 and (1898) president of the American Federation of Zionists, of whose principles he is an active exponent. He is also a member of the central committee of the general organization. He became an editor of the 'Jewish Encyclopædia' in 1901, and published 'The Syriac Grammar of Mar Elia of Zobha' (1887); 'Selections from the Syriac Julian Romance' (1906); 'Zionism' (1914). He wrote many articles on Oriental and Jewish questions for newspapers and reviews, edited the 'Columbia University Oriental Series,' and the 'Semitic Study Series.' He is a vice-president of the American Oriental Society, and treasurer of the American committee for Lectures on the History of Religions and chairman of its committee on publications. He is a son of G. Gottheil (q.v.).

GOTTHELF, gŏt'hĕlf, **Jeremias.** See Bitzius, Albert.

GÖTTINGEN, gĕt'tĭng-ĕn, Germany, town in the Prussian province of Hanover, in the valley of the Leine, 59 miles south-southeast of Hanover. It is a place of great antiquity, and was once famous for its fortifications. It contains a gymnasium, trade school, training school for teachers, a museum of antiquities and the Anatomic Museum, with its famous collection of schools. It contains a noted university, founded in 1734. Göttingen belonged to the Hanseatic League and enjoyed great prosperity until the Thirty Years' War. The manufactures consist chiefly of woolen tissues, tobacco, leather, sugar, chemicals, bologna sausages, paper, books and scientific and musical instruments. Pop. 37,594.

GÖTTINGEN, University of, or GEORG-AUGUST UNIVERSITY, German institution, was founded by George II of England, known also as Georg August, Elector of Hanover. The plan of the school was outlined as early as 1732, was established in 1734 and opened in 1737. Its organization was perfected by Von Münchhausen, who for many years directed its destinies. Its popularity decreased after the expulsion of the seven professors: Albrecht, Dahlmann, Ewald, Gervinus, the two Grimms and Weber, for political reasons, but it has recovered itself since 1866, and has increased with remarkable rapidity since the beginning of the 20th century, having about 3,000 students in 1914, and several eminent names among its professors. The principal building, to which William IV of England contributed £3,000, was completed in 1837. There is a large number of laboratories, clinics, etc., connected with the university and also a museum with extensive and valuable collections, an observatory, a well-equipped school of anatomy, botanical gardens and a library of about 600,000 printed volumes and nearly 6,000 manuscripts. It has also a pedagogical seminary, a gymnasium which dates from the 16th century, a museum, an art gallery of German and Flemish pictures. Consult Pütter, Saalfield and Oesterley, 'Die Georg-August Universität' (Göttingen 1838), and *Chronik der Georg-August-Universität* (annually).

GOTTSCHALK, gŏt'shälk, **Louis Moreau,** American pianist and composer: b. New Orleans, La., 8 May 1829; d. Rio de Janeiro, Brazil, 18 Dec. 1869. He studied in Paris and after his return to the United States in 1853 became the most popular pianist in America. His playing was confined to his own compositions. He traveled extensively in Mexico, the West Indies and South America, and was taken fatally ill, while playing at Rio Janeiro his latest work, 'La Morte.'

GÖTZ VON BERLICHINGEN. See Berlichingen, Götz von.

GOUCHER COLLEGE, Baltimore, an institution of higher learning for women. It was first known as the Woman's College of Baltimore, and was founded under that name in 1844 by the Methodist Episcopal Church. In 1910 it took its present name in honor of the Rev. John and Mrs. Mary Goucher, whose gifts contributed largely to the foundation of the institution. Dr. Goucher was also president of the college from 1890–1908. The principal buildings are Goucher Hall, Bennett Hall and Catherine Hooper Hall. There are also dormitories and fine libraries and laboratories. The degree of B.A is the only one given. A college course for teachers and graduate courses are conducted in co-operation with Johns Hopkins University. The teaching staff numbers 55 and the students 712. There are about 27,000 volumes in the library. The president is Dr. William Westley Guth.

GOUGE, the ground up clay-like material produced by the rubbing of one wall of a fault (q.v.) against the other. Selvage is another term for the same thing, and breccia (q.v.) is used to denote coarser material of the same origin.

GOUGH, gŏf, **John Bartholomew,** American temperance lecturer: b. Sandgate, Kent, England, 22 Aug. 1817; d. Frankford, Pa., 18 Feb. 1886. He came to America in 1829 and two years later became a bookbinder in New York. Falling into dissipation, he lost regular employment and was reduced to giving recitations and singing comic songs at low grog shops. In 1842 he was induced to attend a temperance meeting and take the pledge; and he then made up his mind not only to reform, but to influence others to do likewise. Save for a short relapse, a few months later, his pledge was kept, and ere long, as a temperance lecturer, he became one of the most popular of public speakers in America and England, which he visited on temperance tours 1853–55, 1857–60 and 1878. In later life he handled literary and social topics as well as temperance themes in his lectures. He published an 'Autobiography' (1846; enlarged 1870); 'Orations' (1854); 'Temperance Lectures' (1879); 'Sunlight and Shadow, or Gleanings from My Life Work' (1880).

GOUIN, goo'ăṅ, Sir **Jean Lomer,** Canadian statesman: b. Grondines, Quebec, 19 March 1862. He is a graduate of Laval University, was called to the bar in 1884, and engaged in the practise of his profession in Montreal. He was first returned to the provincial legislature in 1897, was appointed minister of works in

1900 and has been premier of the province since 1905. His administration has since that time been sustained at three successive general elections. He is an officer of the Legion of Honor and was created K.C.M.G. in 1913.

GOUJON, goo-zhôn', **Jean**, French sculptor and architect: b. Paris, 1515; d. about 1570. He was employed with Pierre Lescot, architect of the Louvre, on the restorations of Saint Germain l'Auxerrois, 1542–44; and after the accession of Henry II, decorated the Chateau d'Anet for the king and Diana of Poitiers. To him is ascribed what is considered the masterpiece of French sculpture, the 'Huntress Diana,' now in the Louvre collection, and the fountain of the Innocents at Paris was also his work.

GOULD, goold, **Augustus Addison**, American zoologist: b. New Ipswich, N. H., 23 April 1805; d. Boston, 15 Dec. 1866. He was graduated at Harvard 1825, and in 1856 became visiting physician to the Massachusetts General Hospital. His strong scientific tastes led him to take up investigations in botany, zoology and conchology, and in the latter branch he became one of the most eminent authorities in the whole world. He published 'System of Natural History' (1833); 'Invertebrate Animals of Massachusetts' (1841); 'Otia Conchologica' (1863); 'Principles of Zoology' (with Agassiz, 1848).

GOULD, Benjamin Apthorp, American astronomer: b. Boston, Mass., 27 Sept. 1824; d. Cambridge, Mass., 26 Nov. 1896. He was graduated at Harvard in 1844 and pursued the scientific study of astronomy at several foreign observatories, returning to America in 1848. In 1851 he assumed charge of the longitude department of the United States Coast Survey, and perfected methods for determining the longitude telegraphically. By 1866, 20 longitudes in the United States had thus been determined. He was director of the national observatory at Cordova, Argentina, 1870–85, and there completed three extensive star catalogues, and conducted meteorological and climatological investigations. He was the founder and editor of the *Astronomical Journal* (1849–61) and published 'On the Trans-Atlantic Longitude, as Determined by the Coast Survey' (1869); 'Uranometria Argentina' (1879), etc.

GOULD, Elgin Ralston Lovell, American economist: b. Oshawa, Ontario, Canada, 15 Aug. 1860. He was graduated from Victoria University, was Fellow (1882–84) and lecturer (1892–97) at the Johns Hopkins University, and professor in the University of Chicago (1895–96). In 1896 he became president of the City and Suburban Homes Company of New York, and at one time vice-president of the American Economic Association. In 1901–02 he was lecturer on political economy at Columbia and was city chamberlain of New York 1902–04. He is active in financial, philanthropical and church affairs and reform movements in New York. He has written 'The Housing of Working People'; 'Popular Control of the Liquor Traffic'; 'The Gothenburg System of Liquor Traffic'; 'The Social Condition of Labor.'

GOULD, George Jay, American capitalist: b. New York, 6 Feb. 1864. He was the eldest son of Jay Gould (q.v.) and was educated privately. In financial circles he was active chiefly in connection with his large railway interests, particularly as president, from 1888, of the Little Rock and Fort Smith Railroad, from 1892 to 1913 of the Manhattan Elevated Railroad of New York, and from 1893 of the Saint Louis, Iron Mountain and Southern, the International and Great Northern and the Missouri Pacific. He is a director of many other railroads and is connected with several industrial enterprises.

GOULD, Hannah Flagg, American poet: b. Lancaster, Mass., 1789; d. Newburyport, Mass., 5 Sept. 1865. She was an aunt of B. A. Gould (q.v.), wrote much for magazines and newspapers and at one time very popular as a verse writer. Her verse is simple and pleasant and of a high moral tone. She published 'Gathered Leaves' (1846); 'The Diosma' (1851); 'Hymns and Poems for Children' (1854); 'The Golden Vase'; 'The Youth's Coronal' (1850); 'The Mother's Dream' (1853), etc. 'The Snow-Flake' and 'The Frost' are still remembered and quoted among her poems.

GOULD, Helen Miller. See SHEPARD, HELEN MILLER (GOULD).

GOULD, Jay, American financier: b. Roxbury, N. Y., 27 May 1836; d. New York, 2 Dec. 1892. He was brought up to labor on his father's farm; and was for a short time a student at Hobart College. Here he learned surveying. After making surveys of Ulster, Albany and Delaware counties, he published a 'History of Delaware County' in 1856, and in this same year engaged in the lumber and tanning business in western New York, disposing of his interests prior to the panic of 1857. After engaging in banking for a few months he became interested in railroads. This was directly after the panic of 1857. His first speculation was the purchase of the bonds of the Rutland and Washington Railroad from Troy, N. Y., to Rutland, Vt. He himself became president, treasurer and superintendent of the road. Soon afterward he effected a consolidation of his road with the Rensselaer and Saratoga line, withdrew his capital, removed to New York, opened a broker's office and began dealing in Erie stocks and bonds. His aim was to gain control of the Erie. This he did by depressing the value of the stock and then buying it in. In association with James Fisk, Jr., he entered the directory of the company, was elected president, while Fisk became vice-president and treasurer. On the reorganization of the company, 1872, he lost official connection with it. His manipulation of Erie stock was the first of many similar speculations by which he obtained control of several great railroad systems. His method was to depress the value of the stock of the road he sought to control and to buy it in while at a low ebb. He then invested in the Pacific railroads, secured control of several lines, built branches and effected combinations which resulted in the establishment of what is known as the "Gould system." Jay Gould and his partner, Fisk, in 1869 entered into a scheme to corner the gold market of New York and this resulted in the financial crisis and panic known as "Black Friday" (q.v.). The attempt netted them about $11,000,000. He controlled about 10,000 miles of railroad in 1880, and by merging several competing telegraph lines formed the Western Union system in 1881. In this year he also gained control of the New York Elevated Railroad.

GOULD, John, English naturalist: b. Lyme, Dorsetshire, 14 Sept. 1804; d. London, 3 Feb. 1881. His reputation as a taxidermist procured him the post of curator to the Museum of the Royal Zoological Society in 1827, and in 1832 he published 'A Century of Birds from the Himalayan Mountains.' He next undertook a work of much more extensive character, entitled the 'Birds of Europe,' published 1832–37. This was followed by 'Birds of Australia' 1842–48; 'Mammals of Australia' (1859); 'Monograph of the Trochilidæ, or Family of Humming Birds' (1850); 'Monograph of the Odontophorinæ, or Partridges of America,' etc.

GOULD, Sabine Baring. See Baring Gould, Sabine.

GOULD, Thomas R., American sculptor: b. Boston, 1818; d. 1881. He was a pupil of Seth Cheney, of Boston, and there established his first studio. From 1868 he was in Florence, Italy. His works include a statue of Hancock in the Lexington town-hall; portrait-busts of Junius Brutus Booth, Emerson and Gov. John A. Andrew; and the ideal statues 'The West Wind,' in the Mercantile Library, Saint Louis, 'Christ' and 'Satan.' Other important works are a statue in bronze of King Kamehameha I, Honolulu, and 'A Puritan' on the Common at Cambridge, Mass. Consult Tuckerman, 'Book of the Artists' (New York 1867).

GOUNOD, goo'nō', **Charles François,** French composer: b. Paris, 17 June 1818; d. Saint Cloud, 18 Oct. 1893. He began his studies in the Paris Conservatory under Halévy, Le Sueur and Paër, and carried the Rome prize with his cantata 'Fernando' in 1849. While in Rome he made Italian Church music his chief study. His mass in the style of Palestrina, which he composed in Vienna in 1843 after his return from Rome, was the first fruits of this study. On arriving at Paris he took charge of the music in the church of the Missions Etrangères, and produced no original work until April 1851, when his first opera, 'Sappho,' appeared. Gounod's next production was the five-act opera, 'The Bleeding Nun' ('La Nonne sanglante') (1854). Following this was the comic opera founded on Molière's 'Le Médecin malgré lui' (1858), and the grand opera 'Faust et Marguerite,' which latter was a signal success and was produced with much enthusiasm in all the more important opera houses of Europe. Even in Germany, the home of the Faust legend in music and poetry, the originality and wealth of melody of Gounod's music, together with his powerful orchestration, were so manifest above all else in the opera, that his Faust became a favorite with the public. Later operas of his were 'Philémon et Baucis' (1860), which was not popular; 'La Reine de Saba' (1862); 'Mireille' (1864); 'Roméo et Juliette' (1867), which was favorably received in every opera house of Germany; 'Polyeucte' (after Corneille's drama), which was a failure; finally the comic opera, 'Cinq Mars' (1877), and the last of his grand operas, 'Le Tribut of Zamora,' which was well received. Besides these operatic compositions he wrote much religious music, notably the 'Rédemption,' which was performed in England and later in Germany, and has been very popular in the United States. He also produced at Brussels his 'Mors et Vita,' and in addition wrote cantatas, symphonies, pieces for the piano and numerous songs. During the Franco-Prussian War (1870–71) he resided in England where he formed the Gounod Choir, a chorus of mixed voices, whose concerts were widely popular. Consult Bellaigue, C., 'Gounod' (Paris 1910); Claretie, 'Portraits Contemporains' (1875); Voss, 'Ein Lebensbild' (1895); Hillemacher, P. L., 'Gounod' (Paris 1905); Imbert, H., 'Charles Gounod' (Paris 1907); Prudhomme, J. G., 'Gounod: Sa vie et ses œuvres' (2 vols., Paris 1911); Tolhurst, H., 'Gounod' (New York 1904); Paguerre, 'Charles Gounod, sa vie et ses œuvres' (1890); Boret, 'Charles Gounod, His Life and His Works' (1890).

GOUPIL, goo-pēl', **Jules Adolphe,** French painter: b. Paris, May 1839; d. Neuilly, 30 April 1883. He was a pupil in the studio of Ary Scheffer and achieved success by his powers as a portrait and genre painter. His most famous picture, 'Mme. Roland's Last Day in Prison,' is in the Luxembourg. His father, Adolph Goupil, did much to encourage the introduction of French art into this country; well known throughout Europe as a Parisian picture dealer, he opened a branch house in New York.

GOURA, gow'rạ, any one of a group of large, handsomely dressed pigeons of New Guinea, constituting the genus *Goura* and distinguished by their fan-like crests — the crowned pigeons. These birds are found near open or cultivated lands, ranging near the ground in small flocks and feeding on buds, seeds, berries and other fruits, and on worms, snails and insects. In addition to the cooing heard in the nuptial season, they utter harsh, trumpet-like cries. During the heat of the day, or when alarmed, they hide in the thickest jungle. They make rude nests and lay only one white egg. The best-known species (*G. coronata*) is a beautiful bird as large as a small turkey. It is sometimes kept among poultry, and its flesh is much esteemed. The lovely crests of these pigeons form the millinery ornament "goura," and the birds were threatened with extinction on account of the demand for these feathers until lately put under adequate protection.

GOURAMI, goo'rạ-mĭ. See Goramy.

GOURD, gōrd or goord, a plant of the genus *Cucurbita* or *Lagenaria,* or its fruit. In Europe the name is given generally to pumpkins, squashes, melons, etc., but in America it is restricted to those with hard-skinned, thin-fleshed, inedible fruits, cultivated for ornament or because their excavated shells are useful as dippers, etc. See Calabash Gourd; Cucurbitaceæ.

The Hebrew word translated gourd in Scripture is apparently so much akin to the Greek word *kiki,* used by Dioscorides for the castor-oil plant (*Ricinus communis*), that the "gourd" of Scripture was probably that species. It is a euphorbiaceous plant. The wild gourd of Scripture was a wild vine — that is, was procumbent and had tendrils. It moreover produced «death in the pot,» discoverable in a moment by the taste. It was probably either the colocynth (*Citrullus colocynthis*) or the squirting cucumber. (*Momordica elaterium*).

GOURD-SEED. A fish. See Blackhorse.

GOURD-WORM, the fluke-worm (q.v.) which affects the livers of sheep.

GOURGAND, goor'găṅ', **Gaspard,** Baron de, French general: b. Versailles, 14 Sept. 1783; d. 25 July 1852. Entering the army as lieutenant of artillery in 1802, he distinguished himself in several important battles, and in the battle of Brienne saved Napoleon's life from the Cossacks. He subsequently became Napoleon's adjutant, and as his confidential secretary accompanied him to Saint Helena, but for various political reasons left him in 1818. He was subsequently aide-de-camp to Louis Philippe and became a member of the House of Peers in 1841. In the previous year he was made one of the commission appointed to bring the remains of Napoleon from Saint Helena to France. He was passionately devoted to Napoleon and unreasonably jealous of those who attended upon the emperor in his exile. He assisted Napoleon in writing his ‘Mèmoires’ and was the author of ‘La campagne de 1815’; ‘Mèmoires pour servir a l'histoire de France sous Napoleon’ (1822–23); ‘Rèputation de la vie de Napoleon par Sir Walter Scott’ (1827); and a remarkable journal kept during his stay at Saint Helena, but which remained in MSS. till 1898. An English translation of selections from the journal by Mrs. Elizabeth Latimer (q.v.) appeared in 1903. The work is exceedingly prolix, but of great value, since it records with the minuteness of Pepys, or the precision of Boswell, the incidents of daily life and the conversations of the fallen emperor. In no other work can the personal side of Napoleon be so well studied as in Gourgand's journal. An entire chapter is given to the emperor's criticisms on his own action at Waterloo, and of equal interest are his judgments concerning other great commanders from Cæsar's times to his own. His opinions regarding English character are essentially French in their character and amusing from their entire misconception of it. But in this journal we are shown Napoleon's conversation on almost every conceivable subject, insignificant or important, and always with the frankest egotism.

GOURGUES, goorg, **Dominique de,** French soldier and adventurer: b. Mont-de-Marsan, 1530; d. 1593. Captured by the Spaniards in Italy, where he was serving in the army of Marèchal de Strozzi (1557), he was condemned to the galleys and in 1559 his ship was taken by the Turks; the Turkish ship in turn fell into the hands of the Knights of Malta, who set him at liberty. After many voyages to Africa and South America he signalized his name by taking vengeance on the Spaniards of Fort San Mateo, who under Menendez had massacred the Huguenots of Fort Caroline, Florida. He razed Fort Mateo and killed in battle or hanged every Spaniard he found there. Consult Parkman, ‘Pioneers of France in the New World’ (Boston 1903).

GOURLAY, Robert Fleming, Upper Canada reformer: b. Ceres, Fifeshire, Scotland, 1778; d. Edinburgh, 1863. Before settling in Canada at Kingston in 1817 he had agitated for a reform of the poor laws in Great Britain. His attacks on the land system of Upper Canada brought him into conflict with the government; in 1818 he was twice indicted before a jury and acquitted, and recourse was then had to provisions of an Alien Act of 1804, under which foreigners were compelled to leave the country unless they could prove their innocence. On his refusal to leave the country he was arrested at Niagara, and after being imprisoned for seven months was brought to trial and sentenced to banishment in August 1819. He returned to the province in 1856 and resided there for a few years.

GOURNAY, Jean Oaude Marie Vincent, Seigneur de, French economist: b. Saint Malo, March 1712; d. 27 June 1759. He received his first ideas on economics from his father, a merchant of Saint Malo. Naturally these ideas were based upon commerce and exchange rather than on agriculture. These early opinions were reinforced and developed by Gournay's long residence in Cadiz (1730–44), and by his journeys to Hamburg, Holland and England. He soon acquired a fortune quite sufficient for his moderate tastes. He settled down in Paris. The friendship of Machault and Trudaine readily procured him a position as counsellor to the Great Council, and later as superintendent of commerce. He wrote ‘Observations a la suite des mémoires de Forbannais, la prohibition des toiles peintes’ (1755), a translation of several British works on economics. He exerted a strong influence on a coterie of his younger contemporaries, among whom was Turgot. It was in fact through personal contact with these men that he played the greatest part in economics, rather than through his writings. He was a Physiocrat, and the doctrine of «Laissez faire, Laissez passer» is largely due to him, but he was not an extreme believer in free trade.

GOUT, a disease of comparative infrequency, affecting for the most part the large joints of the foot or knee, and accompanied by a deposition in the joints of a salt or uric acid, notably sodium urate. It is a disease that has been observed for many centuries and many of the older classical writers have left descriptions, jibes and witticisms concerning it. Notwithstanding an immense amount of study of the many factors concerned with gout it remains true that the real essential causes of the disease are still under investigation. Gout is found throughout civilized communities, but it is no respecter of persons, alike affecting the rich and the poor, although it is more prevalent among the former. Whether the afflicted are the «fag-ends» of previously well-to-do families is unknown. Gout is thought to be much more common in England and in Germany than it is in the United States, and the few statistics available, while notoriously unreliable, seem to bear out this belief. Some observers believe that the disease is becoming more frequent in the United States. On this point, however, there are almost no reliable figures. It is a disease of middle years, and men are more often attacked than women.

The symptoms of gout may be grouped under three general heads, acute gout, chronic gout and irregular gout. In acute gout there may be premonitory twinges of pain in the small joints of the hand or foot. These may be accompanied by dyspepsia, restlessness and irritability. The urine is usually diminished in amount, is dark in color and strong in odor. On cooling, a greater deposit of brick-dust urates occurs than is usual. This brick-dust sediment, it should be borne in mind, occurs in practically all healthy urine when cooled. It is not a sign of disease, and quacks would starve if the people did not believe their «brick-dust» horrors. The gout attack frequently commences in the middle of the night, not uncommonly seems to follow an exciting nightmare, often following attacks of excessive anger. There is excruciating pain in some one of the joints of the body, usually of the big toe. The pain is accompanied by swelling, redness and stiffness of the joint, and there may be some constitutional disturbance with a rise of temperature to 102° and 103° F. The symptoms may slowly subside during the day, to recur with equal or diminished severity at a 24-hour interval. After 3, 4 or 6 days the swelling and pain gradually grow less, and in 8 or 10 days the patient may be well. Other joints may be involved, and the attack may last only a few days or may persist for two weeks or more. Occasionally there are accompanying gastro-intestinal disturbances, with nausea, vomiting, diarrhœa, dyspnœa and heart-depression. If an acute attack is followed by other attacks, a condition of chronic gout develops. The joints become sore and remain swollen, and a large number of joints become involved in the reaction. The joints no longer lose their swollen appearance, since deposits of urates take place in the cartilages and in the ligaments, but become further enlarged and distorted. These local collections of urates are termed tophi, and they may be found in other joints — in the hands, knees, elbows and even in the ear-cartilages. The frequent attacks of pain leave the patient much more irritable. He is apt to be dyspeptic, sallow-faced, and to show signs of disease in his heart and blood vessels. Under the term irregular gout have been grouped a veritable scrap-basket assortment of symptoms which different clinicians have thought were undeveloped cases of gout. By many authorities these irregular forms of so-called «gouty diathesis» are taken «with a grain of salt»; yet there is little doubt that a number of more or less definite symptoms are found in those who are moderately gouty which may be attributed to this disease. These irregular forms are frequent in gouty families and include certain forms of chronic eczema, attacks of biliousness with marked constipation, etc. Frequently there is a condition of arteriosclerosis (q.v.) with tendency to the development of slight dropsy or other symptoms of disease of the heart or kidneys. Nervous headaches or migraine may be another heritage, although migraine is such a common disturbance that its presence proves little for any of the many one-sided theories concerning it. Itching feet, hands or eyeballs, irritable bladder with small quantities of acid, high-colored urine, are other symptoms attributed to irregular gout. Occasionally severe forms of eye-disease occur in those thought to be gouty, to account for which no other cause seems probable.

The cause of gout is extremely complicated. The theories are as numerous as the sands of the sea. A bad heredity is one of the most important factors, since from 50 to 60 per cent of gouty patients have had it left to them by their ancestors, one or two generations back. The boys seem more prone to this influence than the girls. Advancing age plays some part, the disease usually setting in before 50 years and generally after 40, although in the markedly hereditary forms the disease may come on much earlier, especially in the irregular manifestations. Alcohol is perhaps the most important contributory factor, those indulging in large quantities of fermented liquors seeming to be much more liable to contract the disease. Among the poor it is chiefly in the ale and beer drinkers that the disease is found. Overeating, lack of exercise and minor injuries to the feet are also important causes of the development of gout. As for the general theories to account for the poisoning — for it seems like a poisoning — all at best are pure hypotheses. Uric acid is considered by many as the chief criminal, but beyond the fact that there is an increased amount of uric acid found in the urine during an attack, and deposits of a salt of uric acid in the joints, there is no proof of its causative influence. Many modern students believe this to be a purely secondary condition, and not a primary one. There is a marked increase in the metabolism of nucleoproteids which in large measure accounts for the increase in one of its products of oxidation, uric acid. Clifford Allbutt has well summed it up when he writes that we are far from sure that gout may not be due to some extrinsic element. The peculiar geography of gout is in need of careful inquiry; the effects of microbic infection of the kidney are unknown in their relation to the precipitation of uric acid. Again, some internal secretion may be at fault, as in diabetes. «Till we know then whether gout is a mere shortcoming in ordinary metabolism, or a peculiar perversion of it, or a static susceptibility of fibrous tissue, or a defect of some enzyme, or a perturbation of the nervous system, or again some factor from without, it appears we must confine the name of gout to the uratic precipitations which are known, and which can serve as a touchstone, and as to all other vague 'acidities,' 'flatulencies,' 'megrims,' and 'biliousness' of whatever occult kind, be content to treat them empirically, awaiting the results of the analysis of our nutritive life upon which biochemistry is actively and hopefully engaged.» Summing up what is really known about the pathology of the disease, it seems established (1) that gout is a morbid condition, of which the most striking phenomena are acute attacks of arthritis (q.v.), which tend to recur and are accompanied by redness, pain and edema of the part; (2) that the affected joints are found to be the seat of a deposit of urate of sodium, which occurs first in the articular cartilages and afterward infiltrates all the surrounding structures; (3) that deposits of this material may also be found in other parts, such as the pinna of the ear, the bursæ, etc.; (4) that excess of uratic material may be demonstrated in the blood of a gouty patient, the amount being greatest before an acute attack, and least immediately after one; (5) that the influence of heredity in producing gout is undoubted; and that certain poisons, such as lead and malt liquors, may induce an attack. In the same manner our ignorance concerning the cause of gout may be summed up by saying (1) that it is not known how the excess of uratic matter is brought about, whether it is due to an increased intake with the food, to increased formation in the body or to deficient elimination by the excretory organs; (2) that it is not known whether the uratic excess is the cause of the phenomena of the disease or is a mere casual accompaniment of the perverted state of nutrition; (3) that it is not known in the case of arthritic attacks whether the deposit of urate of soda is the cause or the effect of the local inflammation; in other words, that gout is a disease the cause of which is not yet fully understood. No study of mental background which is present in gouty individuals has yet been made, but there are enough facts to warrant the surmise that the defect in metabolism which results in a gouty attack may be induced by faulty unconscious mental activities. Chronic unconscious grouches or ingrown bad temper is a most frequent accompaniment of gout and may be a producing cause.

The treatment, however, is on better foundations. Here empiricism has taught the general rule that most people eat and drink too much and that temperance in all things is beneficial in gout as in other experiences in life.

Treatment.— No routine line can be laid down that can be adapted suitably to all cases. Individualism — the treatment of the patient, rather than the disease — is the prime feature. The treatment for gout should include (1) the medicinal treatment of the gouty paroxysm, in acute gout; (2) the medicinal and dietetic treatment of the subacute and chronic conditions, and (3) the treatment of the affected joints, with the object of removing, if possible, the foreign deposits.

The horizontal or slightly elevated position for the limb, with a cradle to take off the weight of the bed-clothes, warm packs, soothing lotions such as the lead and opium wash, and an oil-silk covering constitute the main features in the local treatment of an acute attack. Internally, colchicum, in dosage to be determined by the physician, is the best remedy. A brisk cathartic aids the action of the colchicum, and a mild diuretic may be combined to advantage — citrate of potash, cider, lemonade, being reliable. The pain and insomnia should be controlled by the visiting practitioner. Opium in all its forms is to be avoided. In the treatment of chronic gout attention must be paid to diet. Malt liquors are to be avoided, and the heavy wines, such as port and burgundy. There is no good reason why any particular form of food should be eliminated, but it is paramount that simplicity and undereating rather than overeating should be the rule. The so-called uric acid theory of gout is a pathological hobgoblin. Copious drinking of alkaline waters is of value — largely because of the water. Potassium salts seem to be of service. Above all a charitable and sympathetic attitude of mind must be cultivated. Gout frequently develops in people who have great power or who, unconsciously, would use it ill. The unconscious criminal, or desire to master others, is a not infrequent situation in gout. This should be rooted out by psychoanalytic procedures.

GOUTWEED, or **GOUTWORT,** a kind of wild carrot (*Ægopodium podagraria*) introduced from Europe, where in England it is known as masterwort, herb-gerard, and now a rare weed in waste places along the Atlantic coast of the United States.

GOUVERNEUR, goo'vėr-nėr, N. Y., village in Saint Lawrence County, on the Oswegatchie River, the Rome and Watertown Railroad, about 40 miles south of Ogdensburg. It has large marble works; the talc mines nearby are well developed, and considerable iron ore is mined, and woodpulp is manufactured. It is in a good agricultural region. Pop. about 5,000.

GOVERNING METHODS. See Internal Combustion Engine.

GOVERNMENT is the term used to describe the mechanism or *ensemble* of agencies through which a body-politic formulates and executes its will.

Governments de facto and de jure.— Since they act only as the agents of the sovereign political power, governmental agents in order legally to exercise the functions of their offices are obliged to possess a delegation of powers from the state they represent. In case they are not able to produce a sufficient evidence of this authorization, their acts are *ultra vires,* and as such of no legal force, and they themselves are subject to civil or criminal suit at the instance of parties whose persons or property they may have injured by their acts.

It not infrequently happens, however, that persons claiming political authority, while able to produce satisfactory evidence of their official status and competence, do so by referring to grants of power from a political sovereignty, the legitimacy of which is not admitted by the parties over whom their authority is attempted to be exercised. It thus becomes necessary to distinguish between governments *de facto* (*sed non de jure*) and governments *de jure.*

The terms *de facto* and *de jure* are applicable to governments in a purely relative sense. That is to say, which of the two is properly descriptive of a given political organization depends upon the point of view of those who characterize it. Thus a government is *de jure* as well as *de facto* when it has been established by, claims to represent and is in fact guided by the will of a state the legitimacy of which is recognized by the individuals over whom its control is extended. It is *de facto* but not *de jure* to any particular individual when, though actually in existence and able to exercise a certain amount of power, its legal character is denied by that individual. Thus in the case of an attempted revolution; from the standpoint of those who have repudiated their allegiance to the old state, refuse obedience to its government and have organized for themselves a new political machinery, the old government has but an actual and not a legal existence, the new government being the only one in their eyes possessing a legal basis. Upon the other hand, from the point of view of those who still support the old state, the newly established government has but a *de facto* existence, the old government being conceived as the one legal organization. Thus, during the American Civil War, the existence of the Southern Confederacy as a state was never recognized by the United States nor by foreign powers. The existence of a *de facto* Confederate government was, however, admitted, and its soldiers recognized as belligerents. The continued allegiance of its supporters to the United States was, however, always asserted by the United States, and no legal force of any sort was ever ascribed, then, or after the end of the war, to any of its acts. No formal treaty of peace was entered into with the Southern Confederacy, the surrender of its armies being received simply as military acts, and its government permitted to go out of actual existence without any formal act to mark its demise.

The Ethical Right of Governments to Exist.— The concrete question as to the moral right of a particular government to exist and to coerce individuals is often confused with the abstract one as to the moral justification for the existence of political restraint in general. These two questions are, however, quite distinct, and are to be answered upon quite different principles. So long as men's interests conflict, or, at least, so long as they are conceived by them to conflict, coercion of some sort must result, for the desires of all, under such circumstances, cannot be satisfied. Some will have to give way to others, or all yield in part. The force bringing about the final settlement may be individual, social, political or religious, but in any case restraint is applied and the freedom of action of the individuals concerned correspondingly interfered with. This being so, it is clear that the question as to the ethical legitimacy of coercion by the state is not to be answered by viewing such coercion as a restraint upon individuals who otherwise would possess entire freedom of action. Rather it is to be viewed as a control of individuals who, but for the existence of political government and law, would be subject to the compulsion of other forces. In other words, so long as men's desires conflict there cannot properly be raised the abstract question as to the rightfulness of restraint humanly imposed, or even the question as to its proper amount. The conflict of desires makes coercion inevitable, and the extent of this conflict fixes its amount. The only questions, therefore, that rightfully may be raised are as to the form that the compulsion shall assume, and the general principles that shall guide it. The justification, then, for the existence of any particular political authority, if justification there be, consists in the fact that it furnishes a more intelligent, more beneficial, more just and less painful form of restraint than that which, in its absence, any other force or forces would supply. A state and its government is but an instrument humanly devised for a people's good. It, therefore, has to be justified by its works. There is, thus, no theoretical difficulty in conceiving of a political authority so corruptly and oppressively administered as to cause evils overbalancing those that it prevents. In such a case, it has no ethical right to be. Practically speaking, however, there can be no question but that so grievous are the inevitable evils of lawlessness and anarchy that it is difficult to picture to oneself a political régime so evil in its effects as to render preferable to it a complete absence of political order.

To repeat, then, for the question so often stated in the abstract form as that of the right of the state to be should be substituted that as to the right of its government to be and to exercise the functions that it does and to exercise them in the manner that it does. As the author of this article has elsewhere had occasion to state it: "The right to be of the political authority itself is not in issue, for, abstractly considered, that is, as apart from any particular form of organization, or manner of operation, there is no basis upon which a judgment may be founded. It is not until the state manifests its power and authority that material is afforded to which moral estimates may be applied."

The Doctrine of the "Consent of the Governed." — We are now prepared to examine the meaning and validity of that doctrine, promulgated in the Declaration of Independence, and accepted as fundamental in American political philosophy, according to which all governments "derive their just powers from the consent of the governed."

Without stopping to consider what the founders of the American Union probably meant by this phrase, it may be here said that the principle stated by it has a validity only in so far as it is held to state or imply that all governments should be so administered as to promote to as high a degree as is possible the good of all the governed; and that, therefore, the governed have at all times the moral right — though not necessarily the legal right — to see to it that this is done, and consequently the right, if there be no better way, of overturning an existing government and establishing in its place one more likely to subserve their own general good. Impliedly, then, the doctrine properly means that every state should be so organized as to render possible and easy the discovery of the best interests of the governed. As, however, generally speaking, these best interests are most certainly to be determined by the intelligent wishes of those concerned, this means, in the first place, that, so far as the state itself is able to provide them, agencies should exist for developing the intelligence of its citizens and thus qualifying them to know their own best interests; in the second place that adequate provision should be made for the free expression by the people of their wishes; and, finally, in the third place, that sufficient guarantees should exist that these wishes when made known will be heeded by those in power.

That the foregoing requirements of an ethically defensible government may be satisfied, it is necessary that all public officials shall be held strictly responsible, politically and civilly, for the manner in which they exercise the powers entrusted to them; that freedom of speech and press shall prevail; that the rights to petition, to assemble peaceably and to bear arms shall exist; and that political privileges — the suffrage and the right to be elected or appointed to public office — shall be as widely extended as the intelligence and morality of the citizens will permit. Speaking negatively the doctrine of the "consent of the governed" does not support the legal right, nor, except in extreme cases, the moral right, of each individual citizen to refuse obedience to particular laws which he may consider unjust, nor at will to cast off his allegiance to his state, nor to claim the suffrage or public office as an abstract right.

The ethical right of one people forcibly to subject another people to its political authority, that is, to destroy the sovereignty of its state and annex its territory, as, for example, the right of the United States to control the political destinies of the Filipinos, or of England to extend her authority over the peoples of the South African Republic (Transvaal), and the Orange Free State, is a somewhat different question from that of the right of a particular government to exercise a control over its own citizens. There is an exceedingly strong presumption not only that a given people best knows its own interests and the means of advancing them, but that, stimulated by the consciousness of national independence, it will develop its latent potentialities in a manner that it will not, or cannot, do when subjected to an alien authority. But this presumption, however strong, is one that may be rebutted. It may be made sufficiently plain that a people, because of a lack of intellectual and moral development or a deficiency in natural ability and temperament, is not able either to perceive its own best interests or so to govern its conduct as to realize them when perceived; or, in determining upon its domestic or foreign policies, to give sufficient weight to the moral and legal rights of other states and their citizens. The interests of civilization are superior to those of any particular people. Judged from this general standpoint, it may, therefore, often happen that the forcible subjection of one people to the political rule of another is justified. This right of course appears most plainly in the case of the subjection of an uncivilized people to a civilized nation, but is not necessarily limited to such a case. The continued unsatisfactory political conditions existing among many of the peoples of South and Central America, of the races inhabiting the Balkan Peninsula and of the whole of the Turkish dominions certainly furnishes to the other states of Europe and America a very strong basis of right to intervention. The language of Prof. J. W. Burgess is hardly too strong when, after adverting to the fact that it is in the interest of the world's best civilization that law and order and the true liberty consistent therewith shall reign everywhere upon the globe, he declares that «a state or states, endowed with a capacity for political organization, may righteously assume sovereignty over, and undertake to create order for, a politically incompetent population.»

Classifications of Governments.— As many different classifications of governments may be made as there are characteristics of governments suitable for selection as differentiating elements or factors. The best known of these possible classifications is the one that has come down to us from ancient times, which divides the various kinds of political organization into three main classes, according as the supreme political control is in the hands of a single individual, in which case the government is known as a monarchy; in the hands of a few persons, when it is described as an aristocracy; or in the hands of the general citizen populace, when it is termed a democracy. A further or sub-classification divides each of these three types into normal and corrupt forms, the corrupt monarchy being termed a tyranny, the corrupt aristocracy an oligarchy, and the corrupt democracy an ochlocracy or mobocracy. A still further subdivision divides monarchies into elective and hereditary according to the source whence the monarch derives his right to office; and into absolute or limited (or constitutional) according as the monarch in the exercise of his authority is, or is not, controlled by definite constitutional principles and by the action of other governmental officials selected by the people; aristocracies into particular types according to the principle, wealth or birth, upon which membership in the ruling class is determined; and democracies into direct and indirect according to whether their people directly participate in the control of the state or delegate the exercise of their sovereign powers to officials selected by and responsible to themselves. In the latter case the government is known as a representative democracy or republic. The Constitution of the United States, without defining the term, provides that: «The United States shall guarantee to every State in this Union a republican form of government.» The Federal courts, though they have several times been called upon to construe and apply this clause, have never attempted directly to determine the meaning of the term «republican form of government.» The eminent constitutional jurist, Judge Cooley, gives, however, the following definition which has been generally accepted as correctly expressing the meaning of the phrase as employed in American law and American political thought:

> By republican government, he says, is understood a government by representatives chosen by the people, and it contrasts on one side with a democracy, in which the people or community as an organized whole wield sovereign powers of government, and on the other with the rule of one man, as king, emperor, czar, or sultan, or with that of one class of men, as an aristocracy. In strictness, a republican government is by no means inconsistent with monarchical forms, for a king may be merely an hereditary or elective executive, while the powers of legislation are left exclusively to a representative body freely chosen by the people. It is to be observed, however, that it is a republican form of government that is to be guaranteed; and in the light of the undoubted fact that by the Revolution it was expected and intended to throw off monarchical and aristocratic forms, there can be no question but that by a republican form of government was intended a government in which not only would the people's representatives make the laws, and their agents administer them, but the people would also, directly or indirectly, choose the executive. But it would by no means follow that the whole body of the people, or even the whole body of adult or competent persons, would be admitted to political privileges; and in any republican state, the law must determine the qualifications for admission to the elective franchise.

Another term, often used as synonymous with democracy, is popular government. Strictly speaking, however, this latter term should be employed not to designate any distinct form of political organization, but to describe any government the actual administration of which is to a considerable degree subject to the control of the people. A popular government is thus, in effect, a free government and as such is properly to be contrasted with a despotic government in which the will of the ruler or rulers and not that of the ruled controls. It is in this sense that we speak of the movement toward popular government as having made great strides in England and elsewhere during the last 75 years, though monarchical forms have still been retained.

Constitutional Government.— So closely connected with the advance of popular government, as to be almost identified with it, has been the development during the last century of constitutional government. Those general principles, written or unwritten, that determined the governmental organization of a state and fix the legal competence of its several organs and officials, taken collectively, are termed its constitution. In this sense every state has a constitution, and its government may be spoken of as constitutional. But in its stricter and more usual sense, a constitutional government is one in which the principles determining its specific character, and the extent and mode of exercise of its powers, are definitely determined, and, in general, reduced to precise written statement, and embodied in an instrument or instruments which are not subject to abrogation or amendment except according to certain specified formalities. By this means not only are definiteness of authority, and responsibility of those in power secured, but guaranties provided that existing political liberties shall not be changed except under conditions which usually include a popular assent directly or indirectly given. The value of constitutional government is thus usually but not necessarily that in it the exercise or the direct control of sovereignty is placed in the hands of the people. Its essential feature is that the manner in which the sovereign power is to be exercised by the state is definitely determined. A constitutional government may, therefore, both in form and effect, be but slightly popular in character. In fine, then, the difference between a constitutional and a popular government is that in the former the attempt is made to render the citizens secure against arbitrary action on the part of their rulers; in the latter, means exist for discovering and enforcing the wishes of the governed. The progress of popular government and of constitutional government has almost always gone hand in hand, for the reason that it is but natural that, once established in the effective control of their states, the citizen bodies should have sought to render their power secure by the adoption of instruments of government that might not be altered except under certain prescribed conditions.

The truest tests of the excellence of all governments are the facilities they afford for the formation of an enlightened opinion of the people upon matters of political importance and the precise ascertainment of that «general will» when formed, and the exactness with which the policies it dictates are carried out in practise. The development of popular constitutional governments means that these results are being achieved to an increasing extent. As Prof. Lester F. Ward has said: «Government is becoming more and more the organ of social consciousness, and more and more the servant of the social will. Our Declaration of Independence, which recites that government derives its just powers from the consent of the governed, has already been outgrown. It is no longer the consent, but the positively known will of the governed, from which government now derives its powers.»

A characteristic feature of almost all constitutional governments is the existence of a system of what has been called «checks and balances.» According to this system the several functions of political rule are so distributed among different organs of government that no one of them is given sufficient power to assume an autocratic, despotic control of the state. Thus, in general, the making, the interpreting and the enforcing of laws are placed in different hands. The executive is thus unable to take legal action without the authorization of the legislature, and the acts of both the legislature and executive are subject to review in the courts. Furthermore, the legislative body is usually divided into two chambers, the approval of both, together with that of the chief executive, being required for a valid act of legislation; executive officials are often elected for but short terms of office, and in case of non-feasance or malfeasance of office are subject to impeachment and summary removal from office, and subject to civil and criminal suit for any illegal conduct while in office. In the United States of America the most powerful check of all consists in the fact that the courts have the power of declaring void all legislative acts inconsistent with the provisions of the written constitutions of the United States and of its constituent commonwealths. In those European states which possess written constitutions the courts have not this power, the legislatures being construed to be the judges as to the constitutionality of their own acts.

Presidential and Parliamentary Governments.— A very important classification of constitutional governments is that which divides them into Presidential and Parliamentary.

Presidential government, to accept the excellent definition of Burgess, «is that form in which the state, the sovereign, makes the executive independent of the legislature, both in tenure and prerogative, and furnishes him with sufficient power to prevent the legislature from trenching upon the sphere marked out by the state as executive independence and prerogative.» Thus the governments of the United States and of Germany are of this type. Upon the other hand, «Parliamentary government is that form in which the state confers upon the legislature the complete control of the administration of law. Under this form the legislature originates the tenure of the real (though perhaps not the nominal) executive, and terminates it at pleasure; and under this form the exercise of no executive prerogative, in any sense and manner, unapproved by the legislature, can be successfully undertaken.» As further descriptive of this parliamentary type it should be said that this controlling power thus vested in the legislature almost inevitably tends to become concentrated in its more popular chamber. The government of England best illustrates this form of government. That of France may also be placed in this category. Because the real executive power in a parliamentary government is almost always in the hands of a cabinet of officials holding office only so long as they are able to retain the support of the legislature, this form of political rule is often spoken of as Cabinet government.

The Sphere of Government.— The legal power of a constitutional government at any given time is determined by law. The sphere of political control thus marked out includes all those interests which the state has determined require public control. As we have already learned, legally the state is omnipotent, and therefore may subject to its regulation any matter that it sees fit. Actually, however, considerations of utility and expediency of course control. Regarding the exercise of certain powers, no opportunity for the employment of discretion exists. In order to maintain itself as a sovereign, independent body-politic, it is absolutely necessary that the state should obtain sufficient means, and exercise sufficient authority, to protect itself against attacks from foreign sources, and to maintain law and order, that is, to protect persons and their property throughout its own dominions. The powers, the exercise of which is thus called for, may, therefore, be termed «essential powers,» and in the aggregate they constitute the essential sphere of the state. By some writers they are spoken of as «police powers.» German writers, however, it should be said, use this term somewhat differently, designating as a «Police State» (*Poliseistaat*) one that English and American writers denominate a «Paternal State.» The propriety of the exercise by the political power of these essential duties is not denied by any one except the anarchist. Contrasted to these essential, or, to use the adjective employed by President Wilson, the «constituent» functions of government, which must be exercised by a state in one way or another, are what may be called the non-essential or ministrant functions which all civilized states to a greater or less extent exercise. The activities included in this class are those performed by the state for the promotion of the economic, physical and moral welfare of its people.

As not being absolutely essential to the very existence of the state, there are many who while admitting the necessity for, and the rightfulness of, political control in matters of police protection and national self-defense, assert that the assumption by the state of a right thus further to control the conduct of its citizens is an ethically unjustifiable interference with their freedom, even though the aim of such interference is to advance their own good. In order to maintain this position, however, they are obliged to fall back upon a doctrine of «natural rights,» the invalidity of which is now all but universally recognized. Starting, as from a premise, with the right of a particular state or government to be, as determined by the principles already laid down in this article, the conclusion necessarily follows that, in each individual case, the question whether or not a given matter, whatever its character, shall be subjected to public control, is one the answer to which should be determined wholly by expediency — construing of course expediency so as to include moral as well as material considerations. The arguments of those who urge the establishment of a socialistic or communistic régime are, therefore, not to be met by the simple predication of an abstract individualistic, *laisses-faire* doctrine, according to which an extension of state activities beyond the mere maintenance of order and national independence is ethically unjustified whatever the results to which it may lead. The claims of socialists and communists, in other words, may properly be rejected only by showing that the actual results to which their proposed policies, if adopted, would in all probability lead, would be ethically unjust, or economically disastrous, or both.

This is not the proper place to discuss either socialism or communism. This one observation may be made, however, that the performance by the state of non-essential duties is not, in very many cases, a step toward socialism. The essential aim of socialism is to suppress competition. When there is assumed by the state a function which otherwise would certainly, or in all probability, not be performed at all, it can hardly be said that the field of private initiative is thereby lessened. Under the head of these non-essential, non-socialistic duties, may be grouped all those state activities that are educative rather than coercive, informative rather than controlling. Of this character, for instance, is almost all of the work done in the Departments of Labor and Commerce, and of Agriculture, the Bureau of Education, the Fish Commission and other scientific bureaus of the United States government.

As to what the actual sphere of government in America and Europe is destined to become within the next few years we, of course, can only speculate. The probabilities, however, would seem to be that we are to see a considerable extension of state activities in the sphere of these non-essential, non-socialistic functions. The movement in this direction has for some time been very pronounced and is certainly one not to be deprecated. In the field of socialistic activities, namely, those the exercise of which by the state almost necessarily involves a corresponding diminution of the field of possible private enterprise, the greatest extension of public control within the immediate future will in all probability be seen in the assumption of the ownership and control by central and local governments of the so-called natural monopolies, and in the regulation by law of privately owned and managed industries in which the interests of the general public have become pronounced. Whether the movement toward increased governmental control in this last respect will proceed as rapidly as it has done during recent years one cannot say. The observation may be made, however, that, together with those forces, which, born of the increasing complexity of our social and economic life, tend to make necessary an extension of the activities of the state, there are other agencies the influence of which may be in the opposite direction. Out of an increased intellectual enlightenment and a more widely diffused spirit of altruism may easily arise both an increased ability and a stronger disposition to solve social and economic problems without a resort to the coercion of law. See STATE.

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GOVERNMENT, City. See City Manager; Commission Government; Cities, American, Government of; Cities, European, Government of; Municipal Government.

GOVERNMENT, Proprietary. See Colonial Government, Proprietary.

GOVERNMENT BY COMMISSION. See City Manager; Commission Government; Cities, American, Government of; Municipal Government.

GOVERNMENT CURRENCY. See Currency.

GOVERNMENT BY INJUNCTION, a term used to characterize the putting down of strikes by judicial power of laying injunctions. The first direct interference of the national government in labor troubles was the dissolution of the great Pullman strike at Chicago in 1894, on the ground that it interfered with the carrying of United States mails. This was an executive act; but the courts have since interfered in cases where violence was making the transaction of government business impossible, and brought irresistible government power to bear.

GOVERNMENT PAWNSHOPS IN FRANCE. Historical.— We must go back to the Middle Ages to find the first French banks loaning money on pledges. The Jews, who controlled these establishments, carried on this form of business on lines in which usury played a prominent part. They demanded the deposit of pledges representing double the amount of the loan, and exacted interest at a rate as high as 10 per cent per month.

From a very early period, the royal authorities became acquainted with these abuses and took steps to repress such illegal practises. The first royal decree dealing with the matter was drawn up by Phillippe Auguste in 1218. This decree authorized the Jewish bankers to lend money on pledges, and merely limited the interest to be charged to two deniers per livre (*) per week — that is to say that it was still more than two-fifths of the principal — on sums of money which could not be loaned for more than a period of one year. As the bankers of those days did not respect the terms of the royal decree they were expelled in the year 1226 and replaced by Italian bankers, hailing from Piedmont. These money-lenders profited by the aforesaid decree of 1218 in return for the payment of a certain sum as a license.

The first so-called pawnshop instituted in a French town really having the character of a pledging establishment was founded in 1557 at Avignon, capital of the Comat-Venaissin, at that time under papal domination. Three towns followed the example of Avignon:— Aix, Montpellier and Marseilles, in 1635, 1684 and 1694, respectively. The establishments profited by the decree issued by Marie de Médicis, after the States General had sanctioned in 1694 the creation of pawnshops in every town of the kingdom where such institutions seemed likely to be of public utility. The schemes for the establishment of pawnshops were much delayed owing to lack of capital on the one hand and to illegal activities of powerful adversaries on the other, the latter being fully aware that any new organization would at once put an end to their usurious practices.

On 9 Dec. 1777, Necker drew up the first letters patent for the establishment of the Paris pawnshop. In this document it is stated, *inter alia,* «A pawnshop, or general office whose business it is to loan money on pledges, would appear to be the best means of suppressing that kind of usury which was only too frequently the cause of the ruin of many families.» According to the aforesaid document, all profits resulting from such business were to be applied to the relief of the poor. All cash in hand, with the exception of the sums to be paid to the «Régie» (state administration) and those necessary for the administration of the pawnshop, were to be handed over to the General Hospital. It will be shown during the course of this article that the lien existing between the pawnshop and charitable institutions still exists in modern pawnshops, resulting in partially paralyzing their natural evolution. The success of the Paris pawnshop was so great, that although created without capital, it obtained all the funds required to carry on its business and was able to make loans on pledges to the public during the period 1778 up to the outbreak of the Revolution in 1789, amounting to nearly 200,000,000 livres, or a yearly average of more than 15,000,000 livres. The Revolution, however, put a stop to the development of this promising start, and in 1793 the Paris pawnshop was compelled to suspend its operations. The perfect freedom of financial transactions which had been decreed by the convention of 11 April 1793 provided an opportunity for the usurious bankers, who had not entirely ceased their operations, to recommence their corrupt practices on a larger scale and to charge interest, which had previously been limited to 18 per cent per annum when pawnshops were established, to a rate which soon reached 20 per cent per month. During the Directoire period, the Paris pawnshops endeavored to recommence their operations, but the results were far from satisfactory, due in no small measure to the competition of independent firms. It was during the Consulate that the idea of making pawnshops a state monopoly originated. In a report drawn up by Regnault de St. Jean d'Augley it was stated:—«If, in general, all social transactions ought to be free, there are, however, some which should be governed by special rules in the common interest, so that the public may be protected and not become victims of avarice.» These ideas took shape and a law was passed on the 16 Pluviose Year XII (6 Feb. 1804). In the following pages we will outline the main points of this law, which constitutes to the present day the legal basis for the operation of government pawnshops in France.

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*Currency of the epoch.

General Legislation Governing Pawnshops.—Article 1 of the law of 16 Pluviose Year XII is formal:—No pledging establishment can be founded unless the government's authorization be obtained, and its profits applied to the relief of the poor. In order to make it quite clear that it is a state monopoly, article 2 provides for the closing of any establishment, which, during the six months of promulgation of the law has not been authorized as prescribed in article 1, and such establishment must cease its operations and wind up its affairs within one year. The law contained all the necessary powers to inflict heavy penalties on offenders, who could be prosecuted before the police tribunals and condemned to a corporal penalty ranging from 500 francs to 3,000 francs ($100 to $600), which could be doubled in case of a second offense. These sentences were independent of confiscation in every case of the goods given as security.

The Empire period (1804), which succeeded the Consulate, ratified the application of the law by a decree of 24th Messidor, Year XII (13 July 1804) providing as follows:—(a) the conditions under which the total reimbursement must be effected of the sums paid by the shareholders into the funds of the pawnshops and their elimination from the administration of the establishment; (b) the administrative organization of the Paris pawnshops; and (c) the rules to be followed by the departmental prefects for the organization of pawnshops in places where they would likely to be of public utility, and for the closing of independent firms in such places.

The privilege of making loans on pledges thus organized in favor of pawnshops is still protected by article 411 of the Penal Code which enacts, against those who have kept or established pledging houses, a term of imprisonment amounting to 15 days minimum and three months maximum, apart from a fine ranging from 100 francs to 2,000 francs ($20–$400). The old régime restored by the law of 16 Pluviose and the supplemental decree of Messidor was still further completed by a decree of 8 Thermidor, Year XIII (27 July 1805).

This decree, after prescribing the reimbursement without delay of the shares of the pawnshops, determines the regulations under which the Paris pawnshops will operate thereafter. It is this general regulation which still fixes the principal conditions for the carrying out of loaning operations by pawnshops, and which we will outline in the future in this article. For the present suffice it to say that the terms of the Thermidor decree, by articles 55 and 56, laid down the method of remuneration to be received by the pawnshops from the borrowers, the rates of such remuneration being made up on the one hand, of the interest on the sums lent, and on the other of the expenses of valuation, deposit of security and other general administration expenses. The law of 24 June 1851 defined the legal status of pawnshops and outlined the measures to be taken for better administration. By virtue of this law, pawnshops were recognized as being establishments of public utility, and were governed by the regulations applying to public utility establishments in general, as laid down in the decree signed by the President of the French Republic. The board of directors of pawnshops is presided over by the mayor of the commune, and by the prefect for the department of the Seine for Paris. For Paris the directors are nominated by the Minister of the Interior, and for the departments by the prefect. They are chosen as follows:—one-third from amongst the members of the municipal council, one-third among the directors of charitable institutions, one-third among other citizens domiciled in the commune. One-third of the members are renewed each year. The retiring members may be re-elected. The decree determines the organization arrangements for each one of the pawnshops and the conditions for their management. The manager of a pawnshop, where such exists, or the responsible official, is nominated by the Minister of the Interior, or by the prefect, on the recommendation of the board of directors. In case of refusal by the Minister of the Interior or the prefect, the board of directors is requested to nominate another candidate. The dismissal of the manager is sanctioned by the same authorities. The pawnshops are, as regards their accountancy department, assimilated to charitable institutions, that is to say, they are considered as being governed by the same regulations as the latter.

The endowment of each pawnshop is regulated by article 3 of the law of 1851, and is composed of:—(a) real and personal estate serving for its establishment and those of which it is, or may become later, proprietor; especially donations and legacies; (b) profits and bonuses shown by the annual inventory and capitalized; (c) subsidies which may be granted them out of the communal funds of the department or of the state.

Pawning transactions are effected from:—(a) funds available from the endowment reserve; (b) those obtained by way of loan or which are paid as interest into the treasury.

The conditions of the loans are fixed each year by the administration subject to the approval of the Minister of the Interior or the prefect as the case may be. When the endowment is sufficient either to cover the general expenses or to lower the interest to the legal rate of 4 per cent, the excess receipts are allotted to hospitals or other charitable institutions, by decision of the prefect acting on the recommendations of the municipal council.

A public administrative regulation deals with the appointment and supervision of the intermediary officials nominated to the management of pawnshops. The law of 1851 not only dealt with questions concerning the organization of pawnshops, but prescribed in detail under what conditions the borrowers were authorized to demand the sale of their pledges. Every depositor, after a delay of three months from the date of the deposit, has the right to demand, on the dates of sale fixed by the regulations, the sale of his pledge, before even the date noted on his ticket. The price of the article is handed without delay to the borrower-proprietor thereof, after deduction of the interest due and the amount of expenses fixed by the regulations. New merchandise given as pledge can, however, only be sold after the expiration of one year. Titles of debt, tickets and documents appertaining to the administration of pawnshops are exempt from fiscal taxes and stamp duties under the law of 1851. This law, however, stipulates that with the exception of exemption from taxes, none of its clauses are applicable to pawnshops established on a purely charitable basis, and which, by means of donations or special endowments, lend money gratuitously or at an interest lower than the legal rate. A transitory article of the law of 1851 provides that the terms of the law shall be applicable to those existing pawnshops which have been founded as pawning establishments as distinct from all others.

The state council, on being consulted regarding the scope of this transitory text, expressed the opinion that it was necessary to divide the pawnshops into three categories:—(1) those established on a purely charitable basis and which by means of special endowments lend money gratuitously or at an interest lower than the legal rate; (2) those lending money neither gratuitously nor at an interest lower than the legal rate are authorized to retain their excess receipts to constitute or increase their endowments; (3) those lending money neither gratuitously nor at an interest lower than the legal rate pay all or part of their excess receipts into the funds of the charitable institution under which they were founded.

The state council afterward defined the expression "pawning establishments as distinct from others" to the effect that such term was intended to designate pawnshops previously authorized to retain their excess receipts for the purpose of constituting or increasing their endowments; but the law of 1851 could not affect the privileges of the charitable institutions which profited wholly or in part by the excess revenues. As a result of this interpretation, very few of the pawnshops connected with charitable institutions by common interests were able to free themselves from this financial control, which unquestionably hindered their evolution in the way of reduction of tariffs.

The regulations for loans on corporal guaranty is still further defined by the decree of 24 March 1852, and especially by the general rules dated 30 June 1865, the principal provisions of which will be outlined in the first paragraphs of Part II. This decree of 1865 divided, in particular, all pawnbroking businesses into two categories:—firstly, individual firms, the funds necessary for the carrying on of whose business is provided by a single treasury and who have one office only for the transaction of each particular kind of business with the public; secondly, compound pawnbroker's enterprises, the variety and extent of whose transactions either necessitate the establishment of branches or auxiliary offices, or several offices, sections or treasury centres. The pawnbroking business carried on in Paris falls under the latter category. Finally, a law dated 25 July 1891 authorized the Paris pawnshops to loan money on certain fully paid-up scrip to bearer, no operation, however, to exceed an amount of 500 francs ($100) per borrower. The same law empowers the government to extend, by decree in the form of regulations concerning public administration, the same authorization to such provincial pawnbrokers' enterprises as the government shall deem to be in a position to fulfil the requirements prescribed for this kind of business. It is no longer a question, as regards loans on scrip, of an exclusive privilege as in the case of loans on corporal security, but of a simple right, limited and carrying with it different facilities, to do business concurrently with banks and other banking establishments.

Pawnbroking Operations.—Every application for a loan on corporal security is subject to various formalities including: Valuation of the pledge to be given; offer and acceptation of the loan; the drawing up of a statement of appraisal; official pawnticket; various entries on the books of the deposit office; proofs or authentications required by the regulations; the payment of the loan and delivery of the corresponding pawnticket, or suspension of the payment and delivery of a document respecting the pending loan, or the cancellation of the operation and restitution of the pledge.

In Paris, the valuation of pledges is effected for pawnshops by the public appraisers of the department of the Seine. There are in all 20 of these public appraisers. According to the rules under which they carry out their duties, they have the right to choose their assistants, for whom they are responsible, although they cannot issue official documents without the consent of the administration. The "Compagnie des Commissaires Priseurs" (public appraisers) is responsible to the pawnshops for the results of the valuation and if the proceeds of the sale of a pledge are not sufficient to cover the amount loaned, said compagnie must make up the difference between the price realized by the sale and the valuation on which the loan was based. In the provinces, notably at Lyons and Bordeaux, the valuation is effected by public appraisers also. This, however, is not always the case, as at Lille for instance the appraisement is made by competent valuers attached to the pawnbroking staff. Furthermore, commission agents established in Tourcoing, Armentières, Hallum, Coumines and Estaires are attached to the Lille pawnshop. Finally, at Nice another system exists, the two pawnshops in this town advancing money gratuitously on gold and silver articles only. The appraisement is made by a jewelry expert attached to the administration, by whom he is remunerated. The amount of the possible advance is fixed according to valuation, and a deposit-receipt to bearer is given. The limit of loans based on the valuations is fixed as follows: For silverware, gold or jewels, four-fifths of the value by weight; for all other articles, two-thirds of their value. The minimum of loans is three centimes and the maximum is unlimited. Loans are made for a period of one year. The foregoing are not, however, the only regulations provided in the decree of 8 Thermidor Year XIII (27 July 1805). For instance, by virtue of article 49, should a doubt exist as to the identity of the depositor, or his legitimate ownership of the articles, or his right to dispose of the goods, the payment of the loan may be temporarily suspended pending inquiries. The borrower has the option, however, of giving surety as to his identity. As the loan document must bear a signature, if the borrower is unable to write, such document may be signed by a responsible party known to the pawnbroking authorities.

Redeeming of Pledges.—If at the expiration of the period noted on the loan document, or before that date, or even after such date, so long as the sale has not been effected, the borrower presents the pawnticket and settles his debt in full, i.e., principal, interest and expenses, his property is restored to him. (Regulations of Year XIII (1804–05) modified by article 69 of the law of 30 June 1865). Any respite from sale allowed to the borrower, at his request is not suspensive of the rates of interest. The rate of interest and administrative expenses payable by borrowers are fixed every six months by prefectoral order, but such rate of interest must never exceed 12 per cent (decree of 24 March 1852). In 1913, the Paris pawnshops charged 3½ per cent interest, the same rate for administrative expenses, plus a special tax of 1 per cent which is always payable whatever the duration of the loan, or a total of 8 per cent. If the borrower loses his pawnticket he cannot redeem his property until the due date of expiration. He must then give a special release, testified to by a responsible resident 'householder.

Renewal of Loans.— When the borrower is unable to redeem his loan and desires to avoid the sale of his property, he can demand the renewal of the loan on the same terms as to interest and duration. No renewal, however, will be granted unless all taxes and interest to date are paid, such sum being calculated on a redeeming basis. The pawnshop is authorized to have the pledge revalued, and if it has declined in value the borrower may be called upon to reimburse a part of the loan. A new valuation is obligatory for the following articles: (1) Shawls and woolen goods on which a loan of .50 francs ($0.10) or more has been made; (2) pledges which by special orders and provisionally would no longer be accepted for renewal if this formality is not fulfilled.

It is also obligatory for any articles on which a sum of 1,000 francs or more has been advanced. By virtue of article 81 of the Regulations of 30 June 1865, a borrower renewing his loan may demand to see his pledge so as to satisfy himself as to the proper state of preservation of his property. The Montpellier and Douai pawnshops do not grant renewals, but they give every facility for payment.

Reimbursement by Instalments.— Borrowers have the option of redeeming their loan before its expiration, by instalments, which, however, must not be less than an amount of one franc and which bear interest at the same rate as that charged by the pawnshop.

These instalments constitute what is called a savings-account, and may be used for the partial liberation of the loan, or the renewal thereof.

Payments made by instalment do not, however, prevent the property from being sold on the expiration of the loan, even if the amounts paid are equal to the sum loaned. The administration is under no obligation to supervise these operations and it is, therefore, incumbent on the borrower to take the necessary steps to redeem his pledge or renew the loan, otherwise his property will be sold.

Sales.— Should the loan not be redeemed or renewed at due date, the pledge is sold. Sales take place after the drawing up of an order for pledges to be realized, which order becomes publicly effective upon executive order of the president. Sales are publicly announced 10 days in advance, and the borrower is also advised when the amount of the loan exceeds 16 francs. No opposition can be made to the sale, but if the borrower so requests, the administration usually grants a respite of three months. Sales are always subject to the supervision of public appraisers, even at the gratuitous pawnshop of the "Fondation Mazurel" of Lille. An exception exists, however, in favor of the gratuitous pawnshop of Nice, where sales are made by sworn experts assisted by the director of the pawnshop, the justice of the peace and the comptroller. As previously stated, if the amount realized by the sale is insufficient to reimburse the pawnshop, the public appraisers must make up the deficit between their valuation and the sale price.

As we have pointed out in Part I, par. 2, the law of 24 June 1851 lays down the conditions under which borrowers are authorized themselves to apply for the sale of their security.

Bonuses.—The proceeds of the sale are utilized in the first place to reimburse the pawnshop. If there is any excess it is called a "boni" or bonus, and must be paid over to the borrower (Regulations of 30 June 1865, art. 92). These bonuses are held at the disposal of the parties interested, but if not claimed within three years they revert to the administration (article 93 of same regulations). A claim for a bonus must be accompanied by the pawnticket to bearer. It is not the business of the pawnshop officials to inquire by what means the pawnticket came into the possession of the party presenting it unless it forms the object of a legal attachment. Duval, 'Manuel de Législation,' ¶ 1727.

Nature of the Privilege—Although the privilege of making loans on personal security is reserved for pawnshops it must not be concluded that this is absolutely exclusive. The Civil Code devotes an entire chapter (articles 2073 and following) to the regulations governing the constitution of a private security. But the prescriptions of the Civil Code are very severe and little suited to facilitate this kind of transaction. A public act, or act by privy seal, registered, is required except in cases where the transaction does not exceed a sum of more than 150 francs. Moreover, the secured creditor may obtain payment preferentially on the effects constituting the security, but in this case he must obtain an order from the courts that such effects shall remain his property in payment, and this up to the amount of a valuation made by experts, or that such effects be sold by auction. These protective measures are not, however, the only ones prescribed by the law. Loans on security made between private parties must be distinct and separate transactions, for, as we have pointed out, article 411 of the Penal Code deals severely with persons carrying on business in non-authorized loaning establishments. Jurisprudence has always given the broadest interpretation to the clause contained in the Penal Code in this respect, admitting, notably, that the fact of having loaned money to several people without opening a duly authorized loaning establishment (even without interest) is sufficient to render one liable to the penalties stipulated in article 411 of said Penal Code. On the other hand, pawnshops enjoy an especially favorable régime, such as immunity from fiscal charges and stamp duties, and above all they have the right to sell the articles deposited as security without being obliged to observe the prescriptions of article 2078 of the Civil Code. It must be admitted that the privilege for making loans on security granted to pawnshops gives them a veritable monopoly in this respect, even as regards the constituting of a private security.

Loans on Personal Estate.— The law of 25 July 1891 was not made with the object of allowing pawnshops to encroach on credit or banking houses by authorizing them to loan money on personal estate security, the property of the bearer. The maximum fixed for these transactions, limited to 500 francs ($100), proves at once that the law merely desired to assist small property holders who had made safe investments, the limited nature of which does not interest large banking concerns, and the facilities granted by pawnshops to undertake this kind of business are more in keeping with the momentary needs of small capitalists, The amount of the advances is calculated on the official rate of the Bourse, taking as a basis the last rate for cash transactions of the preceding day. The amount of the loan is fixed in the following proportions: (1) French rentes, treasury notes and bonds, 80 per cent; (2) securities bearing annual interest and deemed by the prefectoral authorities to be good holdings, 75 per cent; (3) «Actions de Jouissance,»* 60 per cent.

The borrower can be called upon, during the duration of the loan, to refund part of the loan if the Bourse rate drops at least 15 per cent, such refund to be made eight days after receipt of notice by registered letter. In case of a drop in the market rate the pawnshop has the right to sell the security on the Bourse in the absence of partial reimbursement, or in the absence of total reimbursement on the expiration of the loan, without being obliged to notify the borrower or carry out any formality. Any deficit resulting from the sale is payable by the borrower; if there is a profit, it is kept at his disposal for 10 years, counting from the date of the sale. After this lapse of time any unreclaimed profit reverts to the pawnshop. The financing of loans on personal security must be effected by means of capital distinct from that used for loans on corporal security. All the clauses contained in the regulations which govern pawnshops and are not contrary to the law of 1891 are applicable to transactions concerning loans on scrip.

Responsibility of Pawnshops in Case of Loss of Goods Pledged.— The Decree of 8 Thermidor Year XIII (27 July 1805) gives borrowers who have not exceeded the date limit fixed for the sale of their pledges the right to claim an indemnity if their property is not restored to them. This indemnity is based on the estimated value of the property at the time of deposit plus one-quarter thereof. (Article 60 of the General Regulations of said Decree). As a general rule, no other claim can be made by the borrower. Exception, however, is made in the case of loss of the pledge as the result of fraud or gross negligence on the part of an employee. In such case ordinary law becomes applicable and the courts decide the amount of indemnity to be awarded, due consideration being taken of cases of «force majeure» when such exist.

The risks of safe keeping of pledges, principally fire, must be covered by the pawnshop, and by virtue of article 67 of the Thermidor Decree all real estate and working capital may be held to constitute the guarantee for depositor's pledges.

Resources and Present Situation of Pawnshops.— No pawnshops, with the exception of those of Arras, Besançon, Boulogne-sur-Mer, Douai and Nancy, possess sufficient funds of their own, and they are obliged to borrow to meet their business needs. The working funds of these establishments are derived from annual loans made to them under decree of 8 Thermidor Year XIII. In Paris, loans are effected as required by voluntary deposits of sums of a minimum of 100 francs ($20). The rate of interest on such investments is fixed yearly, or oftener if any modification is necessary, under the ruling of the prefect of the Seine after approval by the Conseil de Surveillance. (Decree of 25 March 1852, art. 7). Different rates are fixed, based on the date of expiration of the «Bons» (notes) delivered to the security-holders, which notes may be discounted by the pawnshop. To these sums should be added amounts paid to the pawnshops as «cautionments» (surety) and deposits.

As regards gratuitous pawnshops, they derive their funds from foundations or gifts made to them. These establishments form, however, an exception, as we have already pointed out. The present status of pawnshops in France, or let us say their status before the war, can be seen from the general statistics published in 1910, which are given in another part of this article.

GOVERNMENT PRINTING OFFICE, United States, established in 1861 as the official printing and publishing plant of the United States government, occupies a seven-story fireproof brick building in Washington, D. C., built for it in 1902. Its frontage is 408 by 175 feet on two streets and it has an interior court, 30 by 167 feet. An annex later built in corresponding height and style houses the office of the superintendent of documents. Connection with the adjoining city post-office enables it to deliver its enormous mail shipments there direct from the workrooms. A vault capable of storing 2,000,000 electrotype and stereotype plates extends out under the street pavements. The main building was put up under an appropriation of $2,249,000. It has its own power plant and individual motors, without belting or shafting, operating all machinery, elevators, etc., throughout the building. It is equipped with linotype and monotype machines and with all other devices, apparatus and machinery to enable it to turn out at the highest grade and in the largest quantity, and especially with the greatest rapidity, a great variety of work, including bound books, pamphlets, periodicals, forms, specifications, ledgers, loose-leaf binders, envelopes, money-order blanks, postal cards, catalogue cards, in fact, every kind of job printing, binding and book making that Congress and the government offices can use or issue. It is fitted with every device for the aid, safety and comfort of the workers, including automatic carriers pneumatic tube distribution, electric fans, bubbling fountains of cooled and filtered water and a complete hospital with medical attendance day and night. The cost of the machinery in use 30 June 1915 was $2,475,538.86.

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*Such shares do not exist in English or American companies. Sometimes they are translated by the term "dividend shares."

The Government Printing Office employs about 4,000 workers, of whom about one-third are women. It runs continuously day and night, especially while Congress is in session. The title of the head is Public Printer. He is appointed by the President, but reports to Congress. All other employees are appointed by him, under examination and regulation by the Civil Service Commission. Although most of the workers belong to unions, yet the government has affirmed it to be an open shop. The only supervision is by the Joint Committee on Printing of the two houses of Congress, under which body the office contracts for paper, and which body has power "to remedy any neglect or delay in the execution of the public printing." A branch printing office and bindery to do the work of the Library of Congress is in that building, and a smaller branch in the State, War and Navy building, are operated under the Government Printing Office. The scales of wages paid are somewhat in advance of those in commercial establishments, and in addition each employee is given, for each year of service, thirty days' leave of absence with pay.

The work of the Government Printing Office which differs from that of any other combined job printing and book and periodical publishing house — except that this is the largest in existence — is that done for Congress in abnormal requirements of speed and varying amounts. This is largely done between 7 or later P.M. and noon of the next day. Considering the intervals of slack and rush according as Congress is sitting or not, the totally incalculable and enormously varying amount of printing for each day's session which must be rushed through for immediate use, together with the confidential printing, a government printing plant seems a necessity. On account of its own exceptional needs, and also because established under Congress in the beginning, that body is slow in relinquishing a share in the management to other departments of the government, although under its control no 10-year period has passed without an expensive investigation of alleged looseness in administration. Printing for non-Congressional branches of the government being now two to three or more times the quantity done for Congress, it would seem that a directorate representing all branches of the government, with the addition of non-governmental expert membership, might be the solution of the problem of government printing administration.

The office of the superintendent of documents, created in 1895, was made a subordinate bureau of the Government Printing Office. Its functions are to act as a clearing-house and storehouse of United States publications; to distribute them by gift to libraries, especially to those designated as depositories, and by sale to individuals; and to make catalogues and lists of them. Its library, in which is preserved one copy of every edition of everything published by the government, contained 30 June 1916 a total of 193,533 pieces. Complete centralization of distribution in this office has, however, not yet been effected. It delivers to the nearly 500 depository libraries an average of 1,000 publications yearly. It issues a list of new publications each month; an index to the documents and reports of Senate and House each session; and at the end of each Congress a full analytical dictionary catalogue of everything published during the two years.

Appropriations for the Government Printing Office and the public printing and binding for the year ending 30 June 1915 were $5,907,051.30. Of this sum $331,395 was for salaries and expenses of the office of the Superintendent of Documents. There came under the trimming machine 64,151,813 books and pamphlets. Case-bound books totaled 1,744,335. Money order books were shipped to the number of 677,542. Of postal cards there were produced 1,038,063,199.

Consult reports of the Government Printing Office, 1853–date, which include, 1895–date, the reports of the superintendent of documents. For divisions of the office, personnel and salaries, consult the United States Census Bureau, Official Register, latest issue. Reports on operations of the main building were made, 1899–1904, by the officer of the Engineer Department in charge. (Consult entries in document catalogues, issued by the superintendent of documents, for those years. Also brief notices in annual reports of Engineer Department). For description of office consult Pan-American Union *Monthly Bulletin*, November 1910, pp. 737–755; many illustrations; Whelpley, 'The Nation's Print Shop and Its Methods,' *Review of Reviews*, 28:556–563, 1903; Rossiter, 'Problem of the Federal Printing,' *Atlantic*, 96:331–344, 1905. For administration consult United States Printing Investigation Commission, Report, 1906.

GOVERNMENT OF THE UNITED STATES. See UNITED STATES.

GOVERNMENTAL POLICIES, Executive Influence Upon. See EXECUTIVE.

GOVERNOR, in the States, Territories and acquired possessions of the United States. Before the attainment of independence by the English colonies in regions that now form part of the United States, the term "governor" denoted the chief executive of each colony, either appointed by the Crown, or by the proprietor or — as in the case of Connecticut and Rhode Island, and of Massachusetts till it lost its charter in 1684 — chosen by the freemen of the colony (compare an article by the late John D. Long, Governor of Massachusetts 1880–81, in 'Cyclopedia of American Government,' Vol. II, p. 91, New York and London 1914). In each State the governor is now a constitutional official, elected by the qualified voters; his functions and powers are determined by the State constitution. In some States there is elected on the same ballot a lieutenant-governor. Associated with the governor in a few of the older States there is an advisory executive council, each member of which is elected by popular vote from a "councillor district." In Massachusetts their approval of appointments is required, and the governor's responsibilities are shared with them in other ways. "The pardoning power is lodged in the governor's hands. In a few New England States he cannot exercise it except with the concurrence of the executive council, but in most States, as in the

Federal government, it is vested solely in the chief executive.» A tendency is noted to restrict the governor's executive power by assigning to commissions, the appointment of which rests with him, supervision and control of such departments of the public service as railroads, water-supply, lighting, etc. «He is still commander-in-chief of the military forces of the State, and has the appointment of his military staff, but usually the other officers of the militia are now elected by vote from within the various military lines.» In a few States the governor still appoints the judges. His participation in the labors of the legislative branch is to a certain extent direct. Thus, he can call the legislature together for extraordinary sessions; he possesses (save in North Carolina) the power of vetoing enactments, with the exception of constitutional amendments. But not less important — in time of crisis, indeed, even more important — is the governor's influence in shaping legislation «altogether beyond the limitations of his strict constitutional range» by the legitimate exercise of powers inherent in leadership, expressing and enforcing by his utterances the views, the demands and the judgment of his State.

The official standing of governors of the Territories or acquired possessions of the United States is sharply contrasted with that of governors of States. The former receive appointment from the President of the United States and are removable at his pleasure. Moreover, adaptation to varying conditions and circumstances is often required. For example, in the naval government of the island of Guam (a naval station) the governor combines executive with legislative powers. See EXECUTIVE.

GOVERNOR, a device which regulates the admission of steam to a steam-engine, according to the rate of motion. The intention is to maintain uniform velocity, and any acceleration of speed above a given rate causes a valve to be partially closed, diminishing the area of steam passage. The favorite form of governor has a pair of balls suspended from a vertical shaft, so as to swing outward when the shaft is rotated. The greater the speed the greater the centrifugal force, and consequently the farther the balls depart from the axis of rotation; the inclination of the ball arms is made effective in working the valve. See STEAM-ENGINE.

GOVERNORS, Terms of Office, Age Limit, etc See ELECTORAL QUALIFICATIONS.

GOVERNORS' CONFERENCE. The factors that brought about the establishment of the governors' conference in the United States were the three following: (1) the growing centralization of power at Washington; (2) the shifting, uncertain status of State's rights, and (3) the lack of uniform laws. It was felt by many that the nation was confronted by a grave crisis. Vital problems affecting the general welfare of all the people remained unsolved, though they had reached the acute state where solution was imperatively demanded. In 1908 a meeting of governors was held at the White House, Washington. It was called by President Roosevelt, and the principal subject considered at that time was the conservation of natural resources. Early in the following year a second meeting, also at Washington, was held to consider topics coming under State, and constitutionally not under Federal, administration and jurisdiction — such as the questions relating to marriage and divorce, child labor, capital punishment, initiative, referendum and recall, etc. In 1910 a third conference was held at Frankfort, Ky. In 1911, at Spring Lake, N. J., the governors' conference debated with special interest the general subject of intrastate commerce; and the doctrine of State sovereignty, involving control by the several States in such matters, was maintained in protest against the decision of Justice Sanborn, of the Court of Appeals of the United States, in the Minnesota Railway Commission injunction case. A meeting of Western governors was held in 1912; and in the same year conferences were held at Richmond, Va., and Washington, D. C.; followed by a session at Colorado Springs in 1913. The conference at Boston, 24–27 Aug. 1915, merits special attention, although the attendance was not large and it is quite true that, as has been said, «the high hopes that were aroused at the time of the first conference of governors have unfortunately not been fully realized.» One of the subjects — the most vital of all — discussed at the Boston meeting indicates lines of activity along which genuine progress can be made and the public interest faithfully served by the States' chief executives (see article GOVERNOR). That subject was «The Relation of the State to the National Defense.» Finally, the functions of the governors' conference are officially declared to be: «Exchange of views and experiences on subjects of general importance to the people of the several States, the promotion of greater uniformity in State legislation, and the attainment of greater efficiency in State administration.»

GOVERNOR'S ISLAND, N. Y., small fortified island in New York Bay, south of the Battery, and at the entrance to East River. It is separated from Brooklyn by Buttermilk Channel. In 1621, under the name of Nutten Island, it was a station of the West India Company. Later it was used as a residence by the colonial governors of New York, hence its present name. Wouter Van Twiller was the first governor (1637) to use the island for a country residence. In 1708 it was in use as a quarantine station, and in 1784 Gov. George Clinton leased the island to a company who used it for a summer resort and a racecourse. Lord Cornbury in 1702 and Governor Hardy in 1756 urged the erection of batteries on the island; but no definite action was taken until 1794, when there were rumors of a war with France, the State of New York appropriated $250,000 for the erection of a fort and earthworks. The general government appropriated $31,117, and the money was expended for the construction of Fort Jay in the centre of the island. Other sums were used later in improving the fort, but in 1801 the work ceased until 1806–07, when from «an enclosed work of earth and wood» the fort was improved and faced with permanent masonry at a cost of $30,000, and was named Fort Columbus, as at present. The designs for Fort Columbus, also Castle Williams, were made by Jonathan Williams, Lafayette's chief engineer of the army. The plans called for 104 guns for Fort Columbus and 100 guns for Castle Williams. The latter fort exists to this day practically as it was when completed in 1811. Its area is three-fifths of a circle which is 200 feet in diameter, and the walls are 40 feet high. In 1861–65 Castle Williams was used as a prison for Confederates; at one time there were as many as 1,000 prisoners. After the War of 1812 a fortification called South Battery was built at a place to command Buttermilk Channel. Governor's Island is the army headquarters of the Department of the East, a most important military post, embracing the coast from Maine to Florida and including Porto Rico. It has less the look of war than many smaller forts, but it has a garrison usually of three companies, and it is used as a military prison, nearly all the prisoners being deserters. A little church, under the care of Trinity parish, Manhattan, residences for the officers and some storage places are the only buildings in addition to the forts. At the beginning of the 17th century the island was 1,500 feet long and 900 feet wide with an elevation above high-water of 20 feet. Its whole area then was 100 acres. The tide-waters have washed away a large portion of the island. The War Department begun in 1903 the work of reclaiming from the sea the land washed away and the island is now restored to about its former area. The need of modern forts and better defensive equipment on Governor's Island no longer exists since an excellent system of fortifications has been established at the entrance to The Narrows and along the shores of Long Island Sound.

GOVERNOR'S ISLAND, Mass., fortified island belonging to Suffolk County, in Boston Harbor. It is just north of the main ship-channel and of Castle Island. The fortifications form part of the system of defense of Boston Harbor. Fort Winthrop, the keep or redoubt, is an enclosed quadrangular fort with open barbette batteries.

GOWER, John, English poet: b. probably about 1325; d. London, October 1408. But little is known of his life save that he was rich and well educated, did not marry till late in life and became blind about 1400. His tomb is still to be seen in Saint Saviour's, Southwark. He was a personal friend of Chaucer, who, in dedicating to him his ‘Troilus and Cressida,’ addresses him as the “moral Gower”— an epithet that has indissolubly linked itself with his name. Gower wrote three large works in as many languages; the ‘Speculum Meditantis,’ in French verse, long supposed to be lost, but discovered by G. C. Macaulay and published in his edition of the poet's works. The ‘Vox Clamantis,’ a tedious poem in Latin elegiac verse, written 1382–84, describing the rising of the mob under Wat Tyler; and the long poem entitled ‘Confessio Amantis,’ written “in our English . . . for England's sake,” the date uncertain, but at least the poem was in existence in 1392–93. ‘Confessio Amantis’ consists of a prologue and eight books, written in verses of eight syllables, rhyming in pairs. The long prologue gives a sombre account of the state of the world at that time, and the poem opens by introducing the author himself in the character of an unhappy lover. It ends with the lover's petition in a strophic poem addressed to Venus, her judgment, and finally the lover's cure and absolution. Without originality — in J. Russell Lowell's phrase he “raised tediousness to the precision of a science”— narrative power, pathos or humor, Gower yet commands respect for the laborious equality of his verse, and his work remains a splendid monument of English. Consult Pauli's edition (1857); Henry Morley's serviceable reprint in the ‘Carisbrook Library’ (1889); his ‘Complete Works,’ edited by G. C. Macaulay (3 vols., New York 1899–1900); and Dodd, W. G., ‘Courtly Love in Chaucer and Gower’ (New York 1913).

GOWER, Lord Ronald Sutherland-, English author and sculptor: b. 1845; d. 9 March 1916. He was the second son of the second Duke of Sutherland. Educated at Trinity College, Cambridge, he sat in Parliament for Sutherlandshire, and also became known as the sculptor of such works as ‘The Old Guard at Waterloo,’ and the Shakespeare monument at Stratford-on-Avon. Among his writings are ‘My Reminiscences’ (1883), a work of much interest; ‘The Tower of London’ (1901); ‘Old Diaries’; ‘Records and Reminiscences’ (1903).

GOWRIE (gow'rĭ) **CONSPIRACY,** an unexplained episode in Scottish history. On 5 Aug. 1600, James VI, afterward James I, of England, came to Gowrie House, the residence of the Earl of Gowrie, in the suburbs of Perth, having been lured thither, according to one account, by the report of a suspicious person there held in custody. After dining, the king was led aside by Alexander Ruthven, younger brother of the earl, and the king's attendants were told that his majesty had left the castle. An attempt was made by Ruthven, either to murder or to bind the king, who struggled desperately and shouted for help. His retinue coming to his rescue slew Ruthven and Gowrie. The motives of the two brothers have been variously explained. The current belief is that they intended to capture the king and either give him up to England or administer the government in his name in the interest of that country and in that of the Scotch Presbyterian leaders. Others supposed that their object was merely to avenge the death of their father, who had been executed a few years previously. The heavy indebtedness of the king to Gowrie was another cause of irritation. Gowrie House was destroyed and the estates confiscated.

GOYA Y LUCIENTES, gō'yą ē loo-thē-ăn'tās', **Francisco José de,** Spanish artist, caricaturist, etcher and designer: b. Fuendetodas, Aragon, 30 March 1746; d. Bordeaux, France, 16 April 1828. Goya's name ranks with those of Velasquez and Murillo in the history of Spanish art. Of peasant birth, he led an early roving and somewhat dissipated life, his brilliant talents as an artist and a musician with the gift of song making him a favorite both with the wealthy and poorer classes. With the latter he was obviously more in sympathy, and from their daily life drew the picturesque subjects and motives which he turned out in a profusion of sketches, paintings, water colors, portraits, genre pictures, caricatures, designs and etchings. He was equally gifted in all lines of his art and his works in the satirical grotesque are described by Théophile Gautier as “a mixture of Rembrandt, Watteau and the comical dreams of

Rabelais,» while Champfleury compares him to Daumier, the greatest of modern French caricaturists. His early training in art began under Martinez at Saragossa, near his native village, and afterward at Madrid under Bayeu, whose daughter he subsequently married. To broaden his experience, he joined a traveling troupe of toreadors so as to reach Rome, where he spent a profitable period in the examination of the great art collections and in mingling with the everyday life of the people. In 1772, signing his sketch «Pupil of Bayeu, painter to the King of Spain,» he received second prize in a competition from the Academy of Parma. On his return to Spain he began his professional career by painting from 1772–74 the ‹Adoration of God,› ceiling frescoes of the church of Santa Maria at Saragossa, and the frescoes of the ‹Life of the Virgin› at the Carthusian Convent, Cartuja Aula Dei, six miles north of Saragossa. From 1775–91 he designed cartoons of contemporary Spanish life for the royal manufactory of tapestries at Santa Barbara, Madrid; in 1868, long after his death, 43 of these were discovered in a cellar of the royal palace. In 1788 he was elected honorary member of the Academy of San Fernando, and was appointed painter of the chamber to King Charles IV, in 1798 becoming chief royal painter. In 1793 he had replaced Calleja as lieutenant director of the Academy of San Fernando. Spain's political unrest interfered with his career from 1808 until 1813, and later he was compelled to leave Spain. He visited Paris in 1822, returned for a short period to Madrid in 1827, but spent the few last years of his life at Bordeaux where a monument marks his grave. His greatest work is the series of cupola frescoes portraying the life of Saint Anthony, completed in 1798 for the church of San Antonio de la Florida, near Manzanares. He excelled in portraiture and notable are the paintings of Charles III; equestrian portraits of Charles IV and Queen Maria Louisa; a family group of Charles IV; a family group of the Duke of Ossuna; a portrait of himself in the Academy of San Fernando, where also is his famous double portrait of ‹La Maya,› a lovely young female, slightly draped, and nude. In the museum of the Hispanic Society in New York is the portrait of his inamorata, the beautiful Duchess of Alva, also a portrait of General Forastera and several drawings. His ‹Jewess of Tangier› and his portrait of Don Sebastian Martinez are in the Metropolitan Museum of New York city. His work is more popularly known through his numerous etchings, descriptive and satirical, widely reproduced, especially the bull-fighting series, insurrection street fights, folk picture, genre subjects and by his later essays in lithography of which the ‹Bulls of Bordeaux› is a well-known example. ‹Los Proverbios› (Proverbs) and ‹Los Caprichos› (Caprices), virile, weird, grotesque caricatures of established society and religion, with hidden meanings known only to the initiated, are his chief etchings. Consult Hofmann, ‹Catalogue of Goya Etchings› (Vienna 1907); Hunter, ‹Tapestries› (New York 1912); Vilaamil, ‹Los tapices de Goya› (Madrid 1870); also biographies by Brunet (Paris 1865); Calvert (London 1908); Hind, ‹Great Engravers› (London 1911); Muther (London 1905); Stokes (New York 1914); Von Loga (Berlin 1903); Yriarte (Paris 1867); Zapater (Saragossa 1868).

GOYANA, gō-yän'nä, Brazil, city in the state of Pernambuco, on the Goyana River, about 20 miles from the Atlantic. It is a shipping port for sugar, alcohol, dyewoods, cabinet woods and cotton. Pop. 30,000.

GOYAU, gō'yō', **Pierre Louis Théophile Georges,** French editor and author: b. Orléans, France, 31 May 1869. He was educated at the Orléans Lycée, the Lycée Louis le Grand and the Higher Normal School, Paris, and the French School at Rome. Since 1895 he has been associate editor of the *Revue des Deux Mondes.* He married the daughter of President Félix Faure. In 1898 he was awarded the Prix Bordin and in 1908 the Prix Vitet by the French Academy. He is a Fellow of the University of Paris and has published ‹Le Pape, les catholiques et la question sociale› (1893); ‹Autour du catholicisme social› (5 vols., 1896–1912); ‹L'Allemagne religieuse, le protestantisme› (1898; German trans.); ‹L'école d'aujourd'hiu› (2 vols., 1899; 1906); ‹Le francmaçonnerie en France› (1899); ‹Lendemains d'unité: Rome, royaume de Naples› (1900); ‹L'idée de patrie et l'humanitarisme, essai d'histoire francaise› (1902); ‹Les nations apôtres, vieille France, jeune Allemagne› (1903); ‹L'Allemagne religieuse, le catholicisme, 1800–1870› (4 vols., 1905–09); ‹Moehler› (1906); ‹Jeanne d'Arc devant l'opinion allemande› (1907); ‹Ketteler› (1907; translations in Spanish and Italian); ‹Sainte Mélanie› (1907); ‹Autour du catholicisme social› (4th and 5th series, 1910; 1912); ‹Bismarck et l'Eglise: le culturkampf› (4 vols., 1896–1912); ‹Le Vatican,› with Perate and Fabre (1895; German trans). He contributed several articles to the Catholic Encyclopedia.›

GOYAZ, gō-yäz', Brazil, state completely enclosed between the states of Maranhão, Piauhy, Bahia, Minas Geraes, São Paulo, Matto Grosso and Pará. Its area is estimated at 747,311 square kilometers, or, say, 288,536 square miles; but, as a large part of the Araguaya-Tocatins Basin is unexplored, a precise statement in regard to the extent of its territory cannot be justified. The Goyaz plateau with the Pyreneus Mountain range constitute the watershed which divides the basin of the Tocatins and Araguaya rivers from the São Francisco and Paraná basins; the headwaters of the Araguaya and the Paraguay are near one another; and thus the point of divergence of great river-systems is found within this state. The climate of the plateau is excellent; among the mountains extremes of heat and cold are felt; and large districts are well adapted to agriculture. Forests extend along the river-courses, while the elevated lands of the interior have only occasional clusters of trees. The chief products are tobacco, rubber and cattle; the gold and diamond washings which at one time were supposed to be important now yield very little. The capital, Goyaz, formerly called Villa Boa, has about 25,000 inhabitants. The population of the state was given as 340,000 in 1911; of that number nearly 25,000 were Indians or Mestizos. The special interest attached to this state is due to a circumstance which is mentioned in a geographical sketch of Brazil (Washington

1901; compiled by the Bureau of the American Republics), in the following terms: "This state enjoys a splendid climate, and has been selected for the site of the future capital of the republic, the constitution providing for its location on the plateau of Goyaz. A special commission, at the head of which is the director of the observatory of Rio de Janeiro, has already marked the site for the new capital, which is a space 14,400 kilometers square (about 5,500 square miles) on the Upper Tocatins, in the Pyreneus range of mountains. It has an elevation of from 200 to 300 metres above the level of the plateau and is drained by numerous streams of pure water, being the centre of the three hydrographic systems of Brazil. . . . It is here, near the point of divergence of her three great rivers, that Brazil wishes to establish the national capital." But the site thus selected has no natural means of communication with the Brazilian coast. The Tocatins-Araguaya is navigable for only about one-tenth of its entire length; its course is broken by falls and rapids, and as it approaches the Gulf of the Amazon it becomes very shallow. Canals and railways would be required in order to make the rivers commercial highways; moreover, the state is without seaboard — is, indeed, far inland. The isolation of the proposed capital suggests that of Bogotá.

Marrion Wilcox,
Editor Encyclopedia of Latin America.

GÓZAN, Mesopotamia, a district or province called Guzanu in the Assyrian inscriptions, and known as Gauzanitis by Ptolemy. It was situated on both banks of the Khabur River, occupying the upper part of the country which was later the kingdom of Osrhoene. Its history seems to have been a stormy one. It became part of the Assyrian Empire in the 9th century B.C., revolting against Adadnirari V, in the 7th century. In the following century it revolted again, but was put down by Asurdan III. Gozan was also the name of a city in the same district, generally supposed to have been the capital of the province of Gozan.

GOZZI, Carlo, Italian dramatist, younger brother of the brilliant essayist Gaspare Gozzi: b. Venice, 13 Dec. 1720; d. 4 Apr. 1806. On account of his father's financial embarrassments Gozzi spent three years in Dalmatia, seeking a career as a soldier of fortune (1741–1744). On his return to Venice he tried unsuccessfully to bring order into the chaotic family affairs. His natural bent for literature led him to join the Academy of the Granelleschi and to take part in the quarrels that divided the Venetians into the rival literary camps of the partisans of the dramatists Goldoni and Chiari. He attacked both these writers with equal vigor, the former for his fondness for the newer philosophy and for his leaning toward foreign influences in the theatre, the latter for his bombast and ignorance, in ‘La Tartana degli Influssi per l'anno bisestile 1756’, a sort of comic almanack, and in a satirical poem, ‘La Marfisa bizzarra’. In order to prove to Goldoni that any novelty, even the most silly, could attract people to the theatre, and that he could succeed with any fairy tale whatever, he wrote the ‘Amore delle tre melarancie’ (The Three Oranges), drawn from Basile's ‘Cunto delli Cunti’, a 17th Century collection of popular stories. Produced in January, 1761 by Sacchi's troupe of comedians, bringing back on the boards the stock characters of the earlier Italian comedy of masks, and satirizing the two rivals Chiari and Goldoni, the one under the guise of a fairy and the other as a magician, Gozzi's fantastic play won him a magnificent triumph. Between 1761 and 1765 a rapid succession of *fiabe* dramatized from Neapolitan and Oriental fairy tales appeared on the stage,—‘Il Corvo’ (The Raven), ‘Il Re Cervo’ (King Stag), ‘La Turandot,’ ‘Zobeide’, ‘Augellin Belverde’ (The little green bird), ‘Zeim re dei Geni’ (Zeim, King of the Genii), etc. In many cases only an outline of the scene is given; in other scenes the entire action is worked out in prose or in verse. In his later plays Gozzi wrote dramas imitated in the main from the Spanish of Calderon, Tirso de Molina, Rojas and Moreto. His ‘Memorie inutili della sua vita’ (1797) contains very interesting memoirs. Gozzi's fame rests on his *fiabe,* of which ‘Il Corvo’ is the best. Written in the Venetian dialect, they are a capricious mixture of reality and fantasy, of popular forms and *commedia dell' arte,* of allegory and satire, of supernatural beings and stock stage characters. More esteemed abroad than in Italy, Gozzi's reputation spread quickly in France and Germany. Goethe, Tieck, Schlegel praised his work, Schiller adapted his ‘Turandot’; Mme. de Stæl, Sismondi and Musset admired his bold fancies and his whimsicalities. Consult Magrini, G. B., ‘I tempi, la vita e gli scritti di Carlo Gozzi’ (Benevento 1883); Masi, E., ‘Le Fiabe’ (Bologna 1885); Symonds, J. A., ‘The Memoirs, . . . Gozzi's life, the dramatic fables’ (London 1890).

Alfred G. Panaroni.

GRABEN (German, grave), a term applied to a block of the earth's crust which has dropped between two adjacent faults; also used to describe a valley or lowland on the site of such a block. The Rhine Valley between the Black Forest and the Vosges, and the Jordan Valley and Dead Sea depression in Palestine afford well-known examples. See Fault; Horst.

GRACCHUS, grăk'ŭs, **Tiberius Sempronius** and **Gaius Sempronius,** two Roman statesmen: b. about 163 B.C. and 159 B.C.; d. 133 B.C. and 121 B.C. In their attempts to obtain reforms favorable to the commons, they awakened popular commotions of which they themselves became the victims. Tiberius served under the command of his brother-in-law, the younger Scipio, at the siege of Carthage, and was the first man to mount the walls. He was subsequently quæstor to the army of the consul Mancinus, who at that time waged war against the Numantines in Spain. After the defeat of Mancinus, he concluded a treaty with the Numantines, which, without being disgraceful to the Romans, secured to the Numantines their independence. This treaty, however, was opposed by the aristocratic party and repudiated by the Senate. Tiberius, nevertheless, upheld by the populace, in 133 B.C. was elected tribune of the plebs, and sought to reform the condition of the poorer citizens who were without land, and since the great estates of the wealthy were cultivated by slaves, also largely without employment. He endeavored to attain his object by the revival of the Licinian Rogations. It had been decreed, on the proposition of the tribune, Licinius Stolo, «that no one should possess more than 500 acres (*jugera*, each 28,000 square feet) of the public domain (*ager publicus*), and that the overplus should be equally divided among the plebeians.» This law, which was now called the Gracchan, the Sempronian, or by way of eminence the Agrarian Law, he revived, but with the introduction of several softening clauses. The proposition of Tiberius Gracchus was met with the most determined opposition by the ruling party. To counteract his plans the Senate gained over one of the tribunes, Marcus Octavius; and when Tiberius, after having, according to custom, exposed his law 19 days to the public view, proceeded to take the votes of the assembled people upon it, Octavius interposed with his veto, and thus seemed at once to have defeated the whole undertaking. Tiberius now exerted all the prerogatives of his office, sealed up the treasury and forbade all the authorities the discharge of their several offices. He saw, however, that this was of no service to his plan. He therefore took a step till then unheard of in Roman history. At the next assembly of the people he obtained the expulsion of Octavius from office, as faithless to the cause of the people. The bill was thus passed, and a committee consisting of Tiberius himself, his brother Gaius and his father-in-law, Appius Claudius, appointed to carry out its various provisions. All the difficulties which stood in the way of the law now appeared in their full light. Even the preparatory business of ascertaining which was the public land, and which private property, was found to have its full share. Outcries and complaints were made from every part of Italy. When June of the following year came on, in which the tribunes for the next year were to be elected, Tiberius, who had endeavored to regain the favor of the people by some new propositions, offered himself again as a candidate for the office. The aristocrats used every effort to prevent his election, and the ferment in Rome was carried to the highest pitch. One election day went by without any election being made. On the next a vast multitude beset the forum, and the Senate assembled in the neighboring temple of Faith (Fides). Tiberius strove in vain to speak, and was killed in the tumult which followed. The place of the murdered Tiberius was filled by Licinius Crassus, father-in-law of Gaius Gracchus; and on his death Carbo, Fulvius Flaccus and Gaius Gracchus constituted the committee appointed for the enforcement of the law.

In this way the parties had struggled with varying success, when, in 123 B.C., the younger Gracchus, who, as quæstor, had been with the army in Sardinia, obtained the tribuneship. With more varied and shining talents than his brother, he united a stormy eloquence, which carried away his hearers. In the discharge of his office as tribune he first of all renewed his brother's law, which had meanwhile fallen into disuse, and revenged his memory by expelling many of his most violent enemies from the city. At the same time he carried through a law «that every month corn should be sold to the poor at a low fixed rate,» and by another law effected some alleviations in the rigor of the military service, and ensured for the soldiers clothing, besides their pay. The people were animated with an unlimited enthusiasm for their favorite; his enemies were terrified and weakened; hence he obtained the renewal of his office for the following year with ease. His attempt to introduce 300 knights into the Senate failed; but on the other hand, at his proposal the administration of justice was taken from the Senate and transferred to the equestrian order. This gave rise to a new political power in the Roman commonwealth, which, holding a station intermediate between the Senate and the people, had a most powerful influence in its subsequent history. The Senate now resorted to a new but sure means of destroying Gaius. Livius Drusus, a tribune gained over to their interests, had the art to withdraw the affections of the populace from Gaius by making greater promises to them, and thus obtained a superior popularity for himself and the Senate. Hence it resulted that Gaius did not obtain a third tribuneship, and Opimius, one of his bitterest enemies, was chosen to the consulate. In the ensuing civil disturbances Gaius was slain by his slave, at his command. Consult Beesly, 'The Gracchi: Marius and Sulla' (London 1878); Mommsen, 'History of Rome,' Vol. IV (New York 1903–05); Oman, 'Seven Roman Statesmen of the Later Republic' (London 1902); Underhill, 'Plutarch's Lives of the Gracchi' (London 1892).

GRACE, William Russell, American merchant: b. Queenstown, Cork, Ireland, 10 May 1832; d. New York, 21 March 1904. In 1846 he worked his way on a sailing vessel to New York; in 1850 went to Callao, Peru, where he became a clerk in the shipping office of Bryce & Company, and later partner in the firm, which eventually assumed the style of Grace Brothers & Company. He organized the firm of W. R. Grace & Company, now the leading American house in the South and Central American trade, with main offices at New York, and branches at London, San Francisco, Lima, Callao, Valparaiso, Santiago and Concepcion. In 1891 he also established the New York and Pacific Steamship Company. He was Democratic mayor of New York in 1881–82 and 1885–86. His philanthropies were numerous, including the gift of one-fourth the cargo of the United States steamer *Constellation*, dispatched to the aid of the Irish famine sufferers of 1880; and large sums for the building and maintenance of the Grace Institute, established by him in 1897 at New York for the instruction of women in domestic arts and sciences, trades and occupations. He became a member of the American Museum of Natural History and the American Geographical Society, and organized and was elected president of the Nicaraguan canal syndicate, an organization of capital for securing to the United States control of the waterway.

GRACE OF GOD, an expression borrowed from Saint Paul's writings. The apostle frequently employs the term grace in the sense of a gift which enables those who have it to do what they could not do without it. In common parlance we use such expressions as the «gift of music,» the «gift of poetry,» as belonging to one who might acquire many accomplishments, but could never acquire what is meant by a gift for anything. Saint Paul, speaking of his own conversion, his calling to the apostolate and his many labors, says: «By the grace of God I am what I am.» Again he addresses his followers in these words: «By grace are ye saved; not of yourselves, it is the gift of God.»

The Church of England and the Protestant Episcopal Church in the United States teach that grace is the assistance given by God to those who believe in Him, so that they may please Him and keep His commandments. All the Reformed churches agree on this point and they also agree that no man can do good works «as God hath willed and commanded them to be done» (39 Articles), that is, from a right motive and in a religious spirit of devotion, without the grace of God. They also teach that the principal means of grace is prayer, and study of the Scriptures, which latter make a man «thoroughly furnished unto all good works» (1 Tim. iii, 17). To these means of grace the Catechism in the Book of Common Prayer adds the two sacraments, of Baptism and of the Lord's Supper, which are not only means of grace, but also «outward and visible signs» and «pledges» of the grace received by those who participate in them. As defined by the eminent Roman Catholic theologian, Perrone, grace is «that gratuitous inward aid (*auxilium*) which God affords to fallen man through Christ's merits, to enable him to perform supernatural acts, so that he may attain justification and persevere therein» (Prælect. Theol., c. d. Gratia). The Roman Catholic Church's doctrine of grace is opposed on one side to the teachings of Pelagius, who denied the necessity of grace, and on the other to the teachings of those who held that without grace every act of man is a sin, and specifically that «the constancy of Socrates, the continence of Xenocrates . . . must be regarded, not as virtues but as vices» (Melanc. Loci Theol.); and that «from man's corrupt nature proceeds naught that is not worthy of condemnation» (damnabile: Inst. i, 2). Roman Catholic doctrine holds the middle ground between these extremes. As against the Pelagians the Roman Catholic Church teaches that for all acts conducive to salvation (*salutares*) the inner grace of the Holy Spirit is necessary (Conc. Trid. Sess. VI, can. ii, 3). As against Melancthon, Baius and the Jansenists, the same Church teaches that fallen man, before he receives the gift or grace of faith, can perform acts that are morally good. Further, the Roman Catholic Church, in opposition to the teaching of Calvin, holds that a man once justified may fall from that state. Again, the Roman Catholic Church teaches that in all his acts conducive to salvation (*salutaribus*) man is free; in other words, grace imposes on man no necessity.

The Council of Trent in Can. iv of Sess. VI, thus defines the Roman Catholic doctrine of the freedom of man's will while co-operating with grace: «If one shall say that man's free will, moved and stirred by God, co-operates not, by giving assent to God so inciting and calling, toward disposing and fitting himself for grace of justification; or that he cannot, if he wishes, dissent; but that like some lifeless thing he cannot do anything at all and is wholly passive; be he anathema.» The Roman Catholic Church further teaches that the state of grace and holiness in which man was constituted in Paradise was supernatural, something added to the perfection of his human nature; in contradiction to those who teach that this state was in the same sense natural to him as any of his mental or bodily faculties. In consistency with this view such teachers hold that in his fall Adam lost all power and faculty for doing any good act, and that whatever he did was sin. All these views seem to have been influenced by the pre-pagan conception of the graces who bestowed upon man the favors of the gods, without which one could show no special gifts, such as oratory, music and poetry. Thus man, in so far as the graces were concerned, was fated. Christian theologicians, among them Saint Paul, thinking in the terms of their day and looking upon religion as a special gift, were naturally guided by Roman philosophy in describing it. Thus the terms foreordination and predestination seem to have formed a part of the conception of certain religious sections of Christianity from very early days.

GRACES (Greek, *Charites*, translated by the Romans *Gratiæ*), the goddesses of grace, from whom, according to Pindar, comes everything beautiful and agreeable, through whom alone man becomes wise and glorious. They were the goddesses of heavenly light and seem to have been connected with bloom and fertility, which would account for their being patrons of marriage and might also explain the fact that it was customary to swear by the graces who brought prosperity and probably would refuse to be personally favorable to one who swore falsely in their name. According to Hesiod, and most poets and mythologists, Zeus was their father, and Eurynome their mother. Hesiod gives them the names of *Aglaia* (briliancy), *Thalia* (the blooming), and *Euphrosyne* (mirth). Homer mentions them in the 'Iliad' as handmaids of Hera (Juno), but in the 'Odyssey' as those of Aphrodite. He conceived them as forming a numerous troop of attendant goddesses, whose office it was to render happy the days of the immortals. Later poets considered them as allegorical images. They not only improve corporeal charms, they have an influence also upon music, eloquence, poetry and other arts; and the execution of acts of benevolence and gratitude is likewise superintended by them. Saint Paul uses the word grace in the old sense of the term, when he speaks of «the grace of God,» that is the gift of God. He had in his mind the meaning current in his day when the graces were still believed to be the bestowers of special gifts which we now designate as talents. In the earliest times the statues of the Graces represented clothed forms; at a later period they were represented as nude. They had many temples in Greece, partly dedicated to them alone, partly in common with other deities, particularly Aphrodite, the Muses, Eros, Hermes and Apollo. Their festivals were called, in Greece, Charisia; and libations of wine were offered them at meals. The most celebrated Graces of modern sculpture are those of Canova and Thorwaldsen.

GRADATION, that process of dynamical geology by which the external forces of wind, frost, running water, waves and glaciers tend to tear down the earth's surface at one place and build it up at another. The tearing-down process is degradation, erosion or denudation; the building-up process is aggradation or deposition. See Erosion and Geology, particularly section on *Dynamical Geology*.

GRADE CROSSINGS, Elimination of. — Separation of the grade of a railroad devoted to engine and car traffic from the grade of a street or highway for pedestrian and vehicular traffic has long been a public problem. After 1908, when in that year 832 persons were killed and 1,755 injured at grade crossings, the problem received increased attention. Besides accidents and the vexatious interference with street traffic, the aggregate amount of time lost at grade crossings by pedestrians, vehicles, automobiles and street cars was enormous. Elimination of grade crossings is effected by; (1) elevation or depression of the street with no change in the grade of the railroad; (2) partial elevation or depression of the railroad combined with the partial depression or elevation of the street; (3) complete elevation or depression of the railroad with no change in the grade of the street. Of these three methods the best is complete elevation or depression of the railroad with a minimum change in the grade of the street. While ensuring a perfect roadbed for railroad operation, with a minimum of interference with the streets, the cost of warning signs, bells and signals, the maintenance of gates and the employment of flagmen is also eliminated, and the railroad is relieved of a large expense due to personal injury claims. The chief advantage to the railroad is increased speed and freedom of operation. By a law passed in 1889 in Connecticut, each road is practically required to eliminate at its own expense one grade crossing each year, for every 60 miles of road owned or operated. In Chicago where extensive grade separation operations were necessary, the railroad was required to bear the entire cost of track elevation including the cost of bridges and the reconstruction of the streets; the city paid only the property damages, which in most cases were small. In Massachusetts, the railroad pays 65 per cent of the cost, the city not more than 10 per cent, the street railway company using the crossing, not exceeding 15 per cent, and the State the remainder. Unless a street railway is involved, the State's proportion is 25 per cent. State aid laws also exist in Vermont and New York. Consult Bassett, E. M., 'Grade Crossings' (in *New York Public Service Commission, Third Annual Report* 1909); Whitten, R. H., 'Methods of Railway and Street Grade Separation in Cities' (in *Engineering and Contracting* Vol. XXXVI, pp. 442–445, 1911).

GRADIENTIA, grā-dĭ-ĕn'shĭ-ạ. See Urodela.

GRADUAL (Lat. *Graduale*), in the liturgy of the Roman Catholic Church, an antiphon which is sung by the choir or recited by the celebrant of the Mass, immediately after the intoning or the reading of the Epistle (first lesson). The gradual nearly always consists of two or three verses from the Psalms, suggestive of thoughts pertinent to the office of the day. Thus the gradual for the festival of Holy Innocents (28 December) is from the 123d Psalm (in the English Bible 124th): «Our soul is escaped even as a bird out of the snare of the fowler; the snare is broken and we are delivered; our help standeth in the name of the Lord who made heaven and earth.» *Graduale* or *Liber Gradualis* is also the name of a service book of the Latin Church's liturgy: it takes its name from the gradual as just explained, and contains all the graduals for the Sundays and festivals of the entire year, for the use of the choir.

GRADUATION ACT, of 4 Aug. 1854, «An Act to Gradually Reduce the Price of the Public Lands to Actual Settlers.» All public lands which had been in the market for 10 years and upward prior to the passage of the act were to be sold for $1 per acre; all 15 years, 75 cents; all 20 years, 50 cents; all 25 years, 25 cents; all 30 years, 12½ cents — except United States reservations, grants to States for railroad purposes or mineral lands held at over $1.25 per acre. No one was to have over 320 acres, including lands previously taken up.

GRADY, Henry Woodfin, American journalist and orator: b. Athens, Ga., 24 May 1850; d. Atlanta, Ga., 23 Dec. 1889. He was graduated from the University of Georgia in 1868, studied at the University of Virginia in 1868–70, began his journalistic career with contributions to the Atlanta *Constitution,* and for that journal in 1870 described a press tour of Georgia and the resources and possibilities of the State. At Rome, Ga., he edited the *Courier,* and later established and edited the unsuccessful *Daily Commercial.* In 1871 he became Georgia correspondent of the New York *Herald,* and in the same year purchased an interest in the *Herald* of Atlanta, publication of which was suspended in 1876. He then established the *Courier,* which did not long continue, and in 1880 bought a quarter interest in the *Constitution,* of which paper he remained until his death editor and part owner. He was an able journalist, writing for the New York *Herald* some noteworthy letters, including an account of the Hamburg riots in South Carolina; and while editor of the *Constitution,* publishing in its columns vivid descriptions of the Charleston earthquake, and in various magazines articles on the condition and promise of the South. He also became locally known for his oratory, largely through his lecture, 'Just Human,' given at Atlanta. In 1886, at the annual banquet of the New England Society in New York, he made a distinguished address on 'The New South,' which was widely printed and at once gave him a national prominence. Other well-known speeches by him were one on prohibition at Atlanta in 1887, one at the Texas State Fair in Dallas in 1888, and his final and greatest effort, 'The Future of the Negro' (December 1889), before the Merchants' Association of Boston. Grady was the first to present to the North the views of the more enlightened portion of the reconstructed South,— its belief that the «struggle between the States was war and not rebellion,» but at the same time its readiness to identify itself with the united progress of the nation. His eloquent services in this behalf were of much importance. He aided in the establishment of the Confederate Veterans' Home, the election of Gen. J. B. Gordon as governor of the State and the organization of the Atlanta expositions of 1887 and 1889. He declined public office, but was frequently mentioned for nomination to the United States Senate. Consult the 'Life,' by Lee (1896).

GRAETZ, grĕts, **Heinrich**, historian: b. province of Posen, Germany, 1817; d. 1891. He was largely self-taught. In 1853, on the publication of his history of the Jews which won him immediate fame, he was appointed on the staff of the Breslau Jewish Seminary, where he labored 38 years, and later became professor at the Breslau University, which position he held for 20 years. His history in 12 volumes, completed in 1875, has been translated into many languages, and constitutes his chief work. With a genius for construction out of mere fragments and scattered sources and a style picturesque and trenchant, the history gained him a place among the foremost historians of his age. Its defects are not to be denied — a personal bias at times and a want of poise. As a biblical critic, he secured high rank by his erudition and sagacity, marred at times by a fondness for hypothesis and a too ready acceptance of theory for fact. His critical edition of the Psalms (1882–83) is possibly his most notable exegetical work; he wrote also on the 'Song of Songs' and on 'Koheleth.' A complete bibliography of his writings is given in *Jewish Quarterly Review*, Vol. IV, p. 194. His son Leo Graetz, born 1856, professor at University of Munich since 1893, is a physicist of note, through his successful methods in heat and electricity and his published works.

GRAFFITI, grăf-fē'tē, the name given by archæologists to the rude designs and inscriptions of popular origin drawn or engraved with the style upon the walls of ancient towns and buildings, particularly of Rome and Pompeii. Many of these are valuable for the light they throw on popular habits and modes of thought, and the illustrations they often in consequence afford of ancient authors. Graffiti have been found in Greece and Egypt. Some are traced with chalk or plaster, but the majority are scratched on stone or plaster with the stilus, which helps to account for their preservation. Those in Pompeii are found in the Latin, Greek and Oscan languages, showing that the ancient language of Campania was still extant among a portion of the populace. The inscriptions are most frequently amatory or humorous, sometimes malicious or obscene. In Rome they occur frequently in the catacombs, particularly of Sancta Agnese and San Calisto. Many of these are by Christians, some by Pagans, in ridicule of Christianity. See Graphitology.

GRAFTAGE, the process and practice (origin unknown) of propagating plants by the insertion in one of a bud (stock) or twig (scion) of another. It also includes the discussion of all questions relating thereto. The stock may be a complete plant, as in peach budding, or only a part, in which case it may be either a root or a stem part. In some instances (inarching, see below) both plants may have roots. Since the process is dependent upon the coalescence of the cambium (q.v.) of stock and scion the first essential is to make these two surfaces abut; the second is to check evaporation from the cut surfaces.

The many scores of styles of graftage fall naturally into three main groups:

1. *Inarching, or grafting by approach*, the uniting of two plants before the severance of the scion from the plant upon which it grows. After union the scion is severed below the point of contact and the parts of the stock above this point are removed. The method is rarely practised except with subjects hard to graft by more popular methods and for correcting defects of form, such as Y-crotches in fruit trees, a living brace being formed between the two arms. Since it is the only graftage found in nature, it is supposed to be the progenitor of modern methods.

2. *Budding* or *bud-grafting*, the inserting of a single bud beneath the bark of the stock or in some cases (for example, annular or ring budding) in the place of a piece of bark removed. It is always practised upon small stocks preferably under two years old, and always when the bark readily separates from the wood as in spring or late summer. Since spring is a very busy season in nurseries, budding is practically all done during summer. The universally popular method is the shield, so-called from the shape of the scion. It is practically the only method employed in propagating the stone fruits — peaches, plums, etc. The seedling stocks, which are usually not less than one-fourth inch in diameter, are stripped of their leaves close to the ground, are cut through the bark twice on the shady side, the cuts forming a T, the bark lifted gently with the specially formed ivory knife-handle, and the bud inserted and tied with raffia, bast or cotton. A small portion of the bark and a little of the leaf stalk accompany the bud, the latter to act as a handle. In about two weeks, if the bud has taken, the binding is cut on the side opposite the bud to prevent «strangulation.» In case of a failure other attempts are made. No visible growth occurs during that season, but in the spring the bud should become a shoot and the original top of the seedling stock should then be cut a few inches above the union, and later, when the union is firm, this stub is cut off short. At the close of that season the tree is ready for sale.

3. *Grafting proper*, the inserting of a twig into a stock. The methods under this heading may be divided according to the maturity of the scion whether dormant or growing, and also as to the position the graft occupies, whether upon the root, the crown, the stem or the branches. By far the largest amount of grafting is done with dormant wood, and probably upon roots, though grafting upon the branches is widely popular. In *whip-grafting*, which is the one most practised with roots, especially in the nursery propagation of apples and pears and performed in early winter, the seedling roots are specially grown and are as nearly the size of the scions as possible. Both stock and scion are formed alike, two cuts being made, one rather long, diagonally across, and the other parallel with the direction of growth, thus forming a sort of tongue. The tongue of each is then fitted into the slot of the other, the pieces wrapped with waxed string, and stored in a moist, cool place until spring, when they are planted in the nursery. Usually they are sold after two seasons' growth.

Cleft-grafting is most frequently used upon parts of trees above ground or with grapes just below the surface. The stock is sawed across at right angles to the direction of growth, split with a knife and held open with a wedge until the twigs (scions) bearing two or three buds and whittled to a wedge form below are inserted, one at each end of the slit. The wedge is then removed and the wounded surfaces waxed. This method is practised most upon stocks too large for whip-grafting, limbs even as large as three inches in diameter being sometimes used. As a rule small stocks give more satisfactory results. The method is universally employed to change long-established trees to other varieties.

Some other frequently employed methods are: (1) *Bridge-grafting,* which is used for saving young trees that have been girdled by mice or rabbits or otherwise deprived of their bark. The edges of the injured surface are trimmed above and below, and scions, with wedge-shaped ends, are fitted beneath the bark at each of these points. The whole is then covered with wax. Any sprouts that appear are rubbed off so as to force all growth into the stem. The scions soon unite upon their sides as well as to the original trunk. (2) *Veneer-grafting,* which is widely used in greenhouses, consists in inserting a scion upon the side of the stock, binding and protecting it from the air. The method is practised with both ripened and immature wood.

Protection from the air is gained in budding by bringing the bark of the stock in close contact with the scion and by bandages; in grafting, by applying a bunch of damp moss (a greenhouse practice) or covering of grafting wax, grafting clay, etc. (outdoor practice). One of the most popular waxes is made as follows: Melt and thoroughly mix together 3 pounds of mutton tallow, 5 of beeswax and 10 of resin; pour into cold water and work with the hands until the color of pulled molasses taffy. Apply closely while warm enough to spread readily by pressure of the hand. For use in *whip-grafting* balls of woolen yarn are soaked in melted wax and wound around the grafts. Soft waxes are less useful, since they are likely to melt on warm days and in warm climates. No horticultural practice except that of cuttage can compare with graftage in extent of usage and apparent necessity. Like cuttage, its strong points are ease and certainty of operation, maintenance of a variety «true to type» with the comparatively rare exceptions of bud variation, and the modifications which it permits in the habits of plants. Some of the more important of these last are dwarfing, produced by grafting a strong growing scion upon a small growing stock, as pear upon quince; hastening or increasing fruitfulness, as when scions from bearing wood are top-grafted or budded upon young established trees already in the orchard; to counteract injuries (see *bridge-grafting* above); to change poor or unproductive trees into useful ones (see *cleft-grafting* above); to make possible the growing of certain trees upon uncongenial soils, as peaches budded upon plum stocks for heavy soils and plums upon peach stocks for light soils, etc.

Much popular misconception exists as to the limits of grafting. In many instances the possibilities have been found wholly within the individual species; that is, various different but related species fail to unite and grow. Generally, however, the limits are within the genus; for example, plums, peaches, cherries, apricots, etc., readily thrive upon one another. Again there are a few instances of different genera which unite, as among cacti. Genera are, however, arbitrary, man-made groups. Permanent unions between oaks and roses, grapes and pears, and similar widely separated plants have not been reported by reputable horticulturists. Consult Bailey, 'Cyclopedia of American Horticulture' (New York 1900–02); id., 'Nursery Book' (id., 1896); Fuller, 'Propagation of Plants' (id. 1894); Baltet, 'L'Art de Greffer,' and its English translation, 'Budding and grafting.'

GRAFTON, Mass., town in Worcester County, on the New York, New Haven and Hartford and the Boston and Albany railroads, about six miles southeast of Worcester and nine miles northwest of Milford. In 1728 the first permanent white settlement was made, and the town was incorporated in 1735. As early as 1660 John Eliot (q.v.) established here a settlement of Indians whom he had converted. The manufactures are cotton goods, threads, boxes, boots and shoes, emery, and underclothing. The government is regulated by annual town meetings. Pop. 5,705. Consult Pierce, 'History of Grafton' (Worcester 1879).

GRAFTON, N. Dak., city, county-seat of Walsh County, on the Park River, the Great Northern and the Northern Pacific railroads, 15 miles west of the Red River of the North. It is in the great wheat region, and is the trade centre of Walsh County. It has grain elevators, flour-mills, a creamery, machine shops and cattle-yards, and manufactures farming implements. It is the seat of the State Institute for the Feeble-Minded, contains a hospital and a Carnegie library. The city owns the waterworks and electric-lighting plants. Pop. 2,229.

GRAFTON, W. Va., city and county-seat of Taylor County, located in the northern part of the State, 100 miles southeast of Wheeling, and 100 miles east of Parkersburg and on the Tygart Valley River and the Baltimore and Ohio Railroad. The city is the terminus of four branches of the Baltimore and Ohio and owes its importance to the establishment there of the Baltimore and Ohio Railroad machine shops. Grafton has flour and planing mills, a pottery, foundries, cigar and glass factories, and is also engaged in mining and agriculture. There are 10 churches, public and parochial schools and four banks, with a combined capital of $300,000; two weekly and one daily newspapers. A national cemetery is within the city limits containing 1,265 graves, 600 of which are nameless. Municipal affairs are administered by a mayor and two city commissioners elected for three years. The city owns its waterworks. Grafton was founded in 1854, incorporated in 1856 and received its charter as a city in 1899. The population are mainly German and English. Pop. about 9,000.

GRAHAM, grā'ạm, **Charles Kinnaird,** American civil engineer: b. New York, 3 June 1824: d. Lakewood, N. J., 15 April 1889. He entered the navy in 1841, during the Mexican War, served with the Gulf squadron, after study of engineering was appointed constructing engineer of the Brooklyn navy yard, whose great dry-dock and landing-ways were built by him. At the outbreak of the Civil War, he volunteered in the Federal army, and during the war he was twice wounded at Gettysburg and there taken prisoner; commanded the gunboat flotilla in General Butler's expedition up the James River, and was brevetted major-general of volunteers (1865). He was successively chief engineer of the New York dock department in 1873–75, surveyor of the port in 1878–83 and naval officer in 1883–85.

GRAHAM, George Perry, Canadian statesman: b. Egansville, Ontario, 31 March 1859. First employed as a teacher, which profession he abandoned for journalism. He entered the provincial legislature of Ontario in 1890, was provincial secretary 1904–05 and leader of the opposition 1907. He entered the Canadian House of Commons in 1907, and was Minister of Railways and Canals in the Laurier administration, 1907–11.

GRAHAM, Hugh, Baron Graham of Montreal, Canadian newspaperman: b. Huntingdon, province of Quebec, 18 July 1848. He was educated at Huntingdon Academy. His career forms one of the romances of modern journalism. At 15 he entered the office of the *Montreal Daily Telegraph,* of which he became manager two years later. At 19 he was able to buy a half interest in the *Montreal Star,* a paper which he founded, and two years later was sole proprietor. He has devoted his life to the paper, and made it one of the most influential journals in the Dominion. He has been closely identified with the principal patriotic movements in Canada for the past 30 years, is an ardent imperialist and is closely identified with many charitable institutions, especially those of Montreal, to which he has been a liberal benefactor. In 1908 a knighthood was conferred on him, and in 1917 he was raised to the peerage — the first newspaperman in the British overseas dominions and the first native Canadian to be so honored in this way.

GRAHAM, Isabella (Marshall), American educator and philanthropist: b. Lanarkshire, Scotland, 29 July 1742; d. New York, 27 July 1814. From 1774 she was a teacher in Scotland, where, in Edinburgh, she inaugurated the work which led to the organization of the Society for the Relief of the Destitute Sick. In 1789 she removed to New York, and there for several years conducted a successful school. Her philanthropies were many, and were particularly in the interests of education, religious and secular. She founded in 1814 the Society for the Promotion of Industry Among the Poor.

GRAHAM, James Duncan, American topographical engineer: b. Prince William County, Va., 4 April 1799; d. Boston, 28 Dec. 1865. Graduated from the United States Military Academy in 1817, he entered the corps of topographical engineers, in which he attained major's rank in 1838, was astronomer to the survey which determined the boundary line between the United States and the republic of Texas (1839–40), and later United States astronomer in the joint survey of the boundary between the United States and the British provinces. In the determination also of the boundary between the United States and Mexico he held a similar post. Subsequently he directed harbor improvements in the lakes of the North and Northwest, in which he was the first to detect the presence of a lunar tide, and was superintending engineer of the Boston harbor sea-walls and of repairs in various harbor-works along the Atlantic Coast.

GRAHAM, John, Viscount Dundee, commonly called Claverhouse, Scottish commander: b. near Dundee, Scotland, about 1649; d. Killiecrankie, 27 July 1689. He was educated at the University of Saint Andrews, went abroad and entered the service, first of France and afterward of Holland, distinguished himself at the battle of Seneff in 1674, but returned to Scotland in 1677, where he was appointed captain of a troop of horse raised to enforce compliance with the establishment of Episcopacy. He distinguished himself by an unscrupulous zeal in this service, and waged an exterminating war against conventicles. The Covenanters were driven to resistance and a body of them defeated Claverhouse at Drumclog on 1 June 1679. The Duke of Monmouth, however, defeated the insurgents at Bothwell Brig on 22 June, and Claverhouse was then sent into the west of Scotland with absolute power and exercised it in such a manner as to lead to the belief that in addition to the persecuting policy of his superiors he was actuated by personal revenge. The more terrible he made himself to the Covenanters the more acceptable his career was to the government. He rose to the rank of major-general and became a member of the Scottish Privy Council. In November 1688, after William had landed, he received from James in London the titles of Lord Graham of Claverhouse and Viscount Dundee. When the king fled he was in London, but was permitted to proceed to Scotland. He made his escape from Edinburgh with a small company of horse, declared for the king and speedily got together an army of Highlanders, 2,500 strong. He was followed by Mackay, on behalf of the Convention of Estates, whom he finally encountered in the pass of Killiecrankie and thoroughly routed, but was himself slain in the hour of victory. After that, his army melted away. Attempts have been made by Sir Walter Scott and others to throw a halo of romance and heroism around his character; but he was the willing instrument of a cruel government, of the worst government that ever ruled in Scotland, and had himself little sentiment or softness in his nature. Consult Napier, 'Memorials and Letters of John Graham of Claverhouse' (1859–62); biographies by Barrington (1911); Mowbray Morris (1887); and Terry (1905); and Scott's 'Old Mortality' for the Cavalier point of view.

GRAHAM, Sylvester, American reformer: b. Suffield, Conn., 1794; d. 1851. He studied at Amherst College, was ordained to the ministry of the Presbyterian Church about 1826 and became known as a lecturer on temperance and dietetics. His proposed cure for alcoholism was based upon a vegetarian diet. The article of food made of unsifted wheat flour and known as Graham bread was introduced by him into general use. His writings include 'Bread and Bread-Making,' and the 'Graham Lectures on the Science of Human Life' (1839).

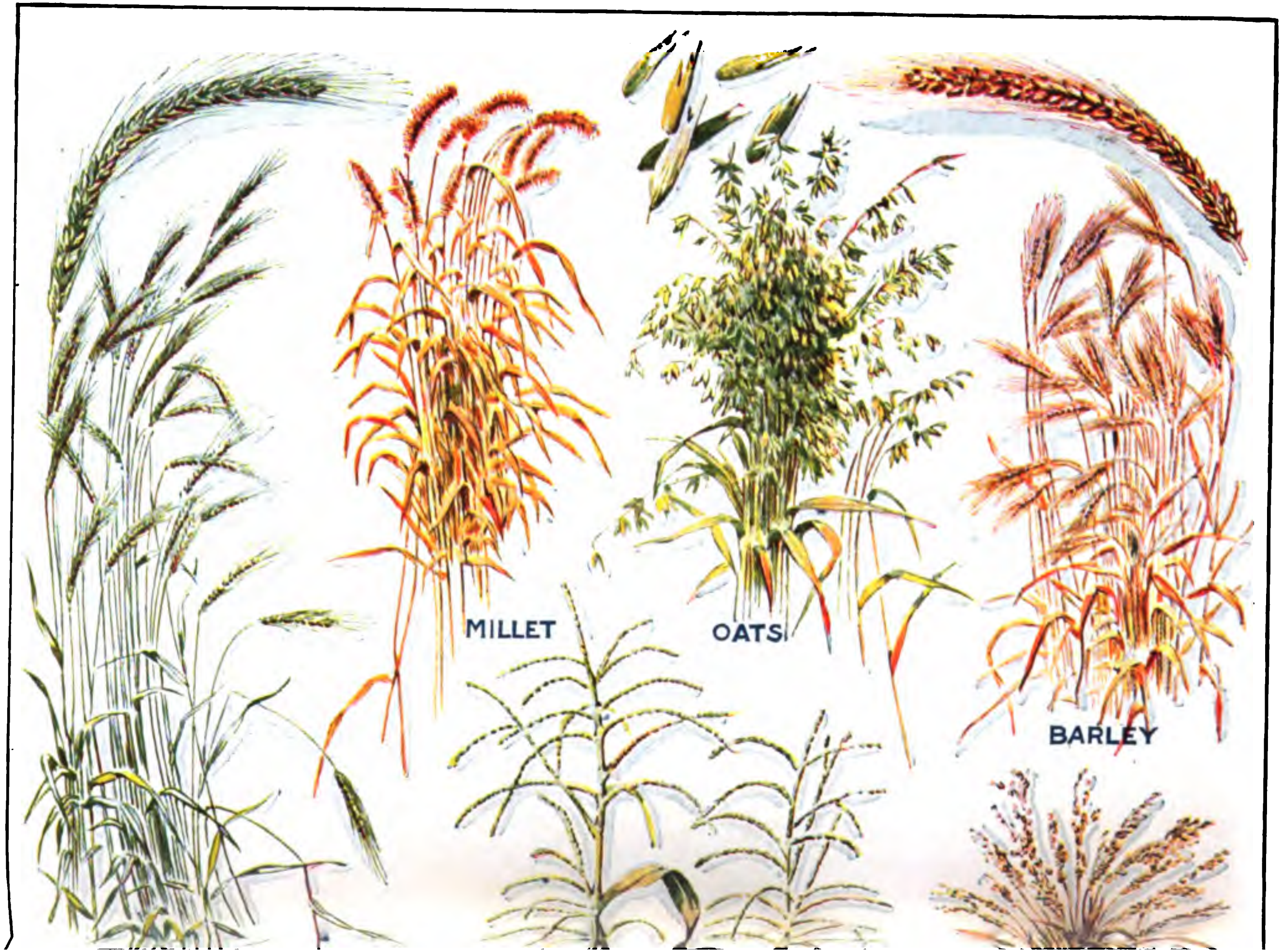
GRAHAM, Thomas, Scottish chemist: b. Glasgow, 20 Dec. 1805; d. London, 11 Sept. 1869. He was educated at the University of Glasgow, and in 1828 communicated to the Royal Society of Edinburgh the results of experiments on the absorption of vapors by liquids. In 1831 he laid before the Royal Society of Edinburgh the result of a series of experiments on 10 different gases, from which he arrived at the conclusion that gases tend to diffuse inversely as the square root of their specific gravities, a conclusion which has been received as the law of the diffusion of gases, and was the inventor of «Graham's tube.» From 1837–55 he was professor of chemistry in the University of London; in 1840 he received the gold medal of the Royal Society, and in the same year was chosen first president of the Chemical Society, which he had assisted in founding. He now began to be employed as consulting chemist in various mercantile and public undertakings, and it was by his recommendation that wood-spirit, or methylic alcohol, was used to render spirits sold free of duty for trade or scientific purposes unfit for consumption as a beverage. In 1846 he assisted in founding the Cavendish Society, of which he was elected president, an office he retained till the close of his life. At the same time he was engaged in investigations on the diffusion of liquids and was the earliest to fully develop that theory. He was appointed master of the mint in 1855. He made many other important discoveries, and was the author of 'Elements of Chemistry' (1842) and various professional papers.

GRAHAM, William Alexander, American politician: b. Lincoln County, N. C., 5 Sept. 1804; d. Saratoga Springs, N. Y., 11 Aug. 1875. He was graduated from the University of North Carolina in 1824, was admitted to the bar in 1826 and entered practice at Hillsboro. From 1833 he was repeatedly elected to the House of Commons, of which in 1839–40 he was speaker. In 1840–43 he was in the United States Senate, in 1844 and 1846 was elected Whig governor of North Carolina, declined a third term, and in 1850–52 was Secretary of the Navy, in which capacity he organized Perry's expedition to Japan. Though at first opposed to secession, he later identified his fortunes with those of his State, and in 1864 took his seat in the Senate of the Confederacy. Subsequent to the war he was an executor of the Peabody fund for the promotion of education in the South and a member of the commission for settlement of the undetermined boundary line between Virginia and Maryland.

GRAHAM LAND, a tract of land, the northern extension of Antarctica, discovered in 1832 by Bisco, master of a British sealer. In 1894 Larsen, a Norwegian, reported the discovery of a continent, one portion of which he named King Oscar II Land and another part Foyne Land. Both proved to be on the coast of Graham Land. The Belgian expedition of 1897–98 explored the west coast, and gave it the name of Palmer Land, in honor of Nathan Palmer, an American sealer, who discovered this coast in 1818. Otto Nordenskjöld spent two years in Graham Land (1901–03); and Charcot, the French explorer, made a series of important surveys between 1905 and 1909. Graham Land is a political dependency of the Falkland Islands. Whaling has within recent years attained importance. A meteorological station has been established by the Argentine government.

GRAHAMITE, a jet black native hydrocarbon or asphalt occurring in veins in various rocks. It is used mostly for roofing materials, also for varnish, rubber substitutes and filler for building blocks. When softened with asphalt it is more rubbery and elastic than gilsonite and less affected by changes of temperature. Occurs in Atoka, Le Flore, Pushmataha and Stephens counties, Okla., and near Granby, Grand County, Colo. Formerly extensively produced in Ritchie County, W. Va., 25 miles southeast of Parkersburg. The production in 1916 was 8,431 short tons, valued at $92,555.

GRAIL, The Holy. The cup or bowl from which Christ drank at the Last Supper. The history of the grail as given in most romances is substantially as follows: After the Last Supper the cup came into the possession of Joseph of Arimathea, who caught in it some of the blood that flowed from the wounds of the crucified Saviour. Being miraculously conveyed to England to escape persecution, he carried the precious vessel with him. Throughout his life it furnished him with food and drink, and with spiritual sustenance as well; and at his death he charged his successor to guard it faithfully. It was handed down from generation to generation, the Fisher King being a descendant of Joseph. This vessel is the grail. According to other versions, the grail chooses its own knights. It possesses miraculous properties, and at times is instinct with divine life. To discover its abiding-place and become one of its guardians is the ambition of good and valiant men, but only the pure in heart may find it. One form of the legend represents three of Arthur's knights, Galahad, Perceval and Bors, as being blessed with a sight of the holy relic. Galahad is said to have had it in his possession, who at his death transferred it to Perceval, and after the death of the latter the cup was taken up into heaven. Students of folklore connect Perceval of the Christian legend with the Siegfried of early German literature and Celtic mythology, but the account of a sacred spear and bowl, as given in the grail romances, appears to be mainly of Christian legendary origin, and to be based upon the lives of saints and certain apocryphal books of the New Testament, principally the Gospel of Nicodemus. It is probable that the Perceval story was familiar, in one or more of its many different forms, to the people of western Britain, before their conversion to Christianity. When the French romancers of the 12th century began to develop the grail idea,— the idea of a sacramental symbol, dwelling among men but discoverable only by the brave and pure,— they wove into their narrations tales of chivalry, mysterious adventures and legends of folklore. Chrestien de Troyes, who was possibly the first writer from whom a grail romance has come down to us, was evidently intending to fuse certain elements of the grail and Perceval legends. He began his work about 1189, but died without completing it. Chrestien's poem was taken up by several other French writers after his death. An introduction was fitted to it,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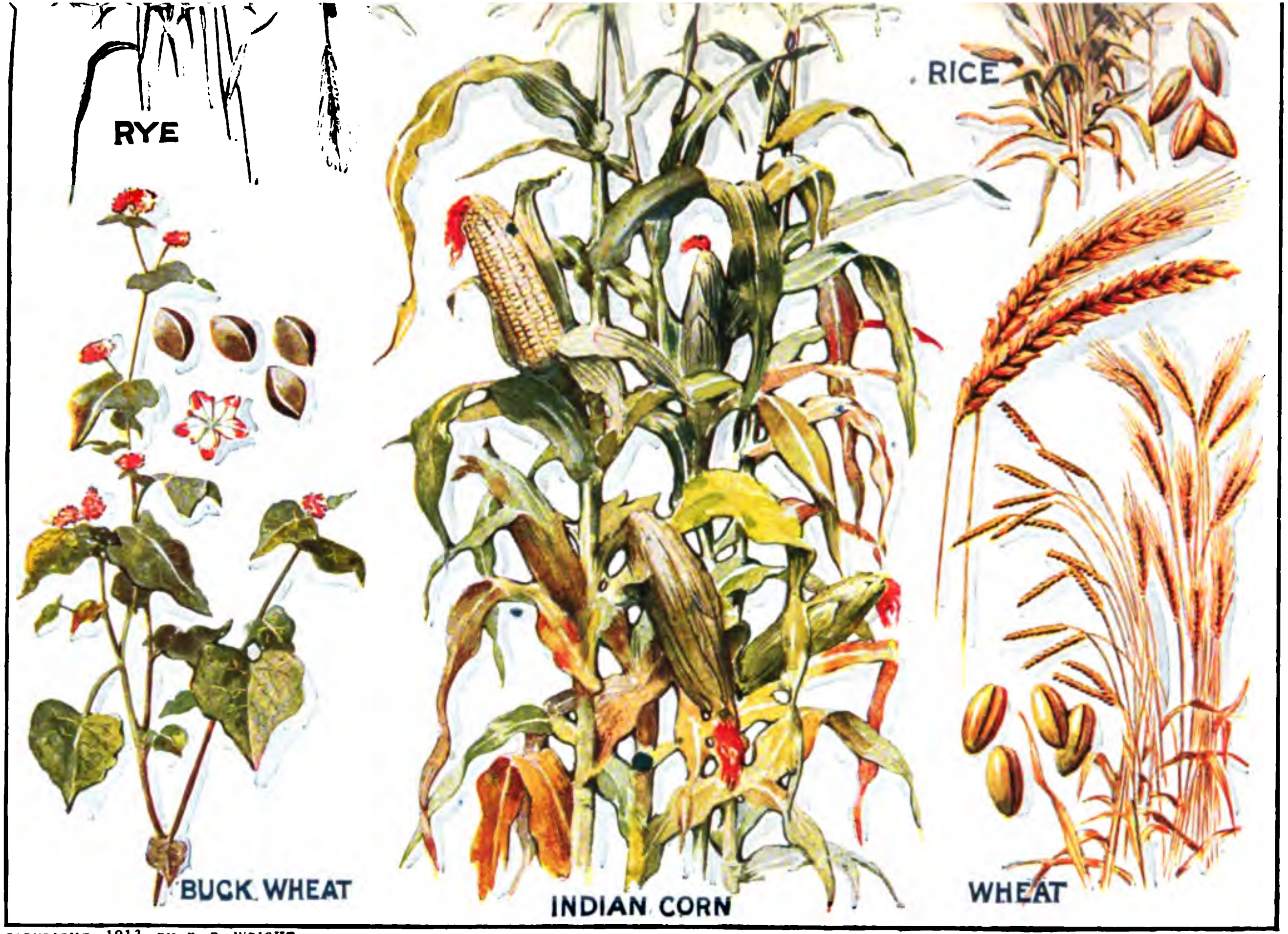

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EDIBLE GRAINS

in which a violent attempt was made to reconcile the Christian and heathen elements. Many thousands of lines were also added, by various hands, in the early years of the 13th century. Meanwhile, probably before the end of the 12th century, Robert de Borron had written, in Old French verse, a trilogy, 'Joseph,' 'Merlin,' 'Perceval,' of which the 'Joseph' and part of the 'Merlin' have been preserved. It was he especially who gave to all the material a Christian character. There are also later prose adaptations of his work. Great difficulty is occasioned by our ignorance of where to place the French prose romance, the 'Queste del Saint Graal,' generally attributed to Walter Map, or Mapes, and another, the 'Grand Saint Grall,' often accredited to Borron. In these the Christian symbolizing tendency is strong, and the story of Perceval is buried under many complicated tales of knight-errantry. They were, however, probably written before 1204. The 'Queste' having been one of the romances followed by Malory in his 'Morte Arthure,' the Galahad story has had a marked influence upon later literature. There are several other members of the early cycle of grail romances, but only one is of great importance,— the 'Parzival' of Wolfram von Eschenbach. The 'Parzival' is his *magnum opus*. It is also the finest narrative poem of which the authorship is known, between the era of classical antiquity and the 'Divine Comedy' of Dante. Furthermore, it is the most complete, and virtually the final, mediæval handling of the two great themes which are involved in the legend of the holy grail, and which Wolfram more thoroughly blends than any other poet.

During the next 250 years it was the mission of the legend of the holy grail to be the spiritualizing tributary of a broader stream of literature, the full current of Arthurian romance. It then remained in obscurity until the 19th century. Modern English and German poets, in reviving the story of the grail, have been moved by the same moral earnestness as Wolfram von Eschenbach, and by the same desire to show the way to seekers after the spiritual life. The best known of the many modern embodiments of this legend are Tennyson's 'Holy Grail' in the 'Idylls of the King,' and the text of Wagner's musical drama 'Parsifal.'

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GRAIN, the seeds of cereals cultivated for the production of meal, flour or other forms of cereal food, and for the feeding of livestock. The principal grains are wheat, oats, corn, barley, rye, rice, emmer, einkorn, spelt, millet, proso and sorghum. Buckwheat, though not a true grain, is usually included. All kinds of grain contain nutritious substances of a similar character, although they vary, both in quantity and proportion, in various grains. These elements are: (1) Gluten, which affords the tissue-building nourishment for the animal body; (2) Fecula or starch, which provides the bodily heat and energy; (3) A sweet mucilage called dextrin, which is more nutritious than starch, but is small in quantity, and renders the grain liable to the vinous and acetous fermentation; (4) A small proportion of fat, ranging from 1 per cent in barley to 6 per cent in oats; (5) A digestible, aromatic substance contained in the hulls, which consist of fibrous matter; (6) Moisture, which is predominant even in the driest grain, and increases the weight of the mass, although it lessens the specific gravity; it affords no nourishment, hastens the decomposition of all kinds of grain, if they are not kept very dry, and influences germination.

According to the 1910 census, grain constituted 48.6 per cent of the total value of all farm products in the United States. The grains are used principally for human food, although very large quantities are fed to poultry and cattle and other farm animals. The greater part of the oat crop goes to feed horses, and a large portion of the corn crop is used in fattening swine. It has been estimated that grain products supply about 43 per cent of the nitrogenous part of human food, 9 per cent of the fat and 62 per cent of the starch. Besides being ground to make flours and meals, and a variety of cereal food preparations, quantities of grain are used in making beers and other malt liquors and distilled liquors. Other quantities are made into glucose and vinegars, besides the multitudes of smaller quantities used in the arts.

The efforts to improve the food quality of the grain crop and to increase its acre-yields are unremitting. In Germany alone there were before the European War 46 breeders of rye, 84 breeders of wheat, 64 breeders of barley and 53 breeders of oats. In the United States and Canada every agricultural experiment station is busy with the same problems, and with such success that the possible yield of grain has been raised within a few years, through the introduction of new varieties, by four bushels for every acre sown.

Grain is so large a part of the world's food that its collection and distribution is an important part of the world's business. In the United States and Canada it is usually handled in bulk, although in a few localities, notably on the Pacific coast, it is generally marketed in bags. From the grain farms it is hauled in the farmer's wagon to the nearest railway siding, where the grain is emptied into the chute of a «receiving house» or railway elevator holding about 5,000 bushels. It passes through a cleaner which removes all dirt, grass and bits of straw and sticks, into the «boot» of the elevator «leg»— a tube in which an endless belt carries attached buckets to the top, or head, of the elevator. From there it is distributed to one of the grain bins. Freight cars are run in under the spouts of the elevator, the grain is carried up to the elevator head again, thence into a hopper where it is weighed, and then loaded into the cars. These cars are made up into trains for Kansas City, Saint Louis or Chicago, as the case may be. Arrived at one of the great elevators the grain is again weighed and carefully graded, and a warehouse receipt issued for it. Through this receipt it goes into commerce, and the grain may be sold and resold many times with the transference of the receipt. From these central elevators it is eventually loaded into cars, barges or steamships, depending upon its destination.

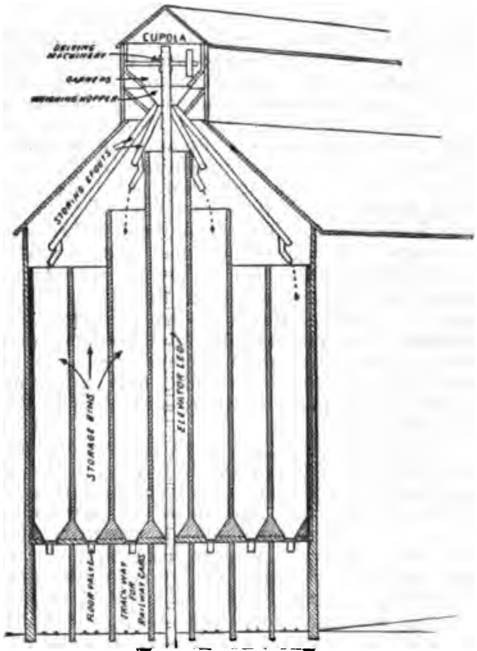
Grain is sold generally by sample. Each grain has its particular grades — as, for instance, of wheat: white winter, red winter, hard winter, hard spring, western red, western white, etc. These are market divisions, and more or less arbitrary, as there are no fixed standards. All grain is inspected as it comes into the market, and again as it goes out into commerce. This inspection may be done by a local board of trade or officially by the State.

In the United States a series of reports on the current condition of the grain crops of the country is issued every year by the Bureau of Crop Reports. They begin with a report in March upon the amount of grain still in the hands of the farmers at that time. The April report tells the condition of the winter wheat and rye. In May another report on the winter grain crop tells the acreage which has been abandoned as not worth harvesting. In June the report gives the condition figures for the growing winter grain, and the acreage and prospects of spring wheat. The July report gives the acreage of corn planted and the stocks of grain at that date remaining in the farmers' hands, and also another set of condition figures by which the crop about to be harvested may be very closely estimated. In September the official estimate of the wheat and rye crops is given, and in October the official estimate of the corn crop and the spring grains. In December the actual yields of all grains are given. Aside from the government reports, the grain exchanges and the large commission houses throughout the country receive reports from their own correspondents resident in the grain regions, and there are also special experts who travel about the grain country making estimates and reporting privately to their principals, the grain dealers.

The world's production of the principal grains, according to the latest figures of the United States Bureau of Crop Estimates, is as follows: Oats (1915), 4,783,778,000 bushels; wheat (1915), 4,216,806,000 bushels; corn (1914), 3,864,279,000 bushels; rye (1915), 1,711,158,000 bushels; barley (1915), 1,542,972,000 bushels. The grain crop of the United States in 1915 was: corn, 3,054,535,000 bushels; oats, 1,540,362,000 bushels; wheat, 1,011,505,000 bushels; barley, 237,000,000 bushels; rye, 49,190,000 bushels. See articles under the names of the different cereals. Consult Bailey, E. H. S., 'The Source, Chemistry and Use of Food Products' (Philadelphia 1914); Carleton, M. A., 'The Small Grains' (New York 1916); Sherman, H. C., 'Food Products' (New York 1914).

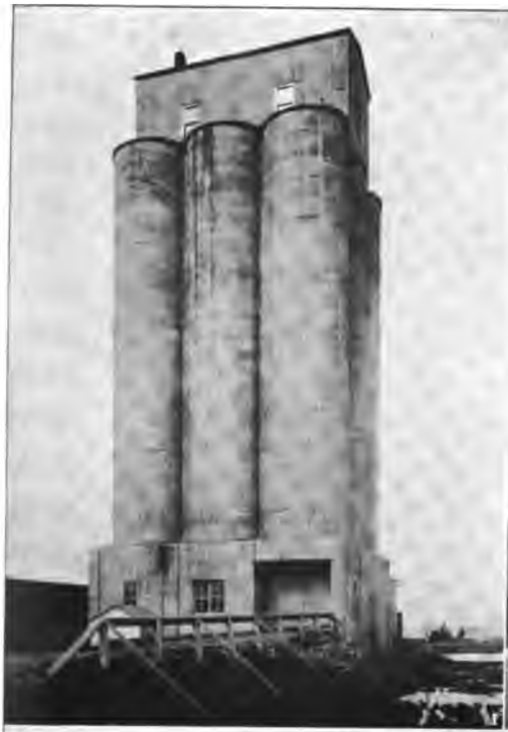
GRAIN ELEVATOR, a structure equipped with adjustable elevating machinery for the purpose of unloading and storing grain, which is subsequently loaded directly into railway cars, canal boats or grain-carrying vessels for transportation. In addition to these primary services the modern grain elevator has machines for cleaning the grain, drying it if necessary and weighing it.

The smaller or "country" elevator consists generally of a building or "house" surmounted by a smaller structure called the "cupola." The house is divided into a series of deep storage bins, while the cupola contains the machinery for operating the "elevator leg," the turnhead spouts, the garners, the weighing machines and the cleaning machinery. It is usually constructed of timber with brick outside walls for the house, and corrugated sheet iron for the roof and walls of the cupola. Many elevators, practically firepoof, are built with solid brick walls enclosing steel bins surmounted by steel framed cupolas roofed with terra-cotta or sheet iron, while in others the construction is of structural steel encased with concrete. Further protection is obtained by housing the steel storage bins and the operating machinery in separate fireproof buildings, the grain being handled between them by a system of pneumatic conveyers. Since 1902–05, a period of experimentation with not a few failures, the preferred material for grain elevator construction has been reinforced concrete, even for the smaller buildings. The first cost is usually 20 per cent higher than for wood, but the very large saving in insurance and depreciation soon account for that difference. The larger plants are now built with a "working house" and a storage section adjacent. In the working house is gathered all the machinery, and it often contains considerable storage room. The concrete bins are cylindrical and built touching each other, and the spaces between them are also used as storage bins. The largest grain elevator



GRAIN ELEVATOR.

GRAIN ELEVATORS



1 and 3 Grain Elevators **2 Concrete Silo**

of this type in the world has recently been completed for the Armour Grain Company, on the Calumet River at Chicago, at a cost of $3,500,000. The working house has 93 bins 14 feet in diameter and 74 feet high, with a capacity of 931,000 bushels. The main storage bins are 130 in number, 22 feet in diameter and 104 feet high, with a combined capacity of 4,383,000 bushels. The working house has six receiving legs, six shipping legs, eight cleaner legs, five clipper legs, three screening legs, six drier legs and three bleaching legs. Each leg has a capacity of 10,000 bushels per hour. The walls of the storage bins are uniformly 7 inches thick. Some of the great Canadian elevators have bins over 30 feet in diameter and 8 inches thick.

There are two distinct types of grain elevating machinery: that in which the grain is carried up by buckets attached to an endless belt traveling in the "leg," and the pneumatic elevator, in which the grain is sucked up a tube by a current of air. In the first type the leg is a two-chambered construction, the endless belt carrying the buckets running up one chamber and down the other, the whole being capable of vertical adjustment — hoisted high so as to pass over the side of a great ship, or lowered so as to touch the bottom 40 feet or more below. In operation the leg is lowered into the cargo of grain and swiftly running belt scoops up the grain in its buckets and empties it in a receiving chamber. Here it is taken by another belt called the lofting belt and carried to the top of the elevator to a hopper known as the garner. Immediately below the garner is the weighing apparatus into which the grain falls through a spout, and from which it is sent onward to the cleaners if necessary and then to the storage bins. In the pneumatic system there is no leg, but the suction tube hangs from the end of a hollow crane-like boom which can be swung over the vessel to be unloaded. This tube is flexible and telescopic, so that it can be made to reach any level and into the farthest corner of the vessel's hold. A powerful vacuum pump at the inner end of the boom exhausts the air in the tube, and the air in the hold of the ship rushes up to fill the vacuum, taking the grain along with it to the vacuum chamber. From here it is directed to the scales, cleaners and bins. There are several advantages in the pneumatic system not possessed by the other. The suction tubes are flexible and extensible, and may be moved to any point in a ship where the grain may be: the elevator leg is rigid and the grain must be brought to its foot by hand labor or by supplemental machinery. In the matter of the health and comfort of the laborer also the pneumatic system leads, as it produces neither the dust nor the heat of the bucket elevator. On the other hand, the operation of the pneumatic elevator is considerably more expensive and this has militated against its installation in many of the newer and larger elevators. The pneumatic system has been very successfully used to transfer grain long distances and in this it has no competitor.

Unloading and storing from cars is accomplished as follows: The grain-laden cars are usually run up along the side of the building so that each car is placed directly under an elevator leg. Two men in each car, operating shovels by ropes from a steam-driven shovel shaft, shovel the grain into the pits of the elevator leg, and thus fill the buckets of the conveyor, which, operating continuously, carries it up to the cupola, where the buckets are tipped over automatically and their contents discharged into the turnhead spouts. From these the grain passes by gravity into the garners, thence into the hoppers of the weighing machines, thence to the cleaners if desirable, and finally through a system of spouts to the storage bins.

When transferring grain from ships to railway cars the elevator legs are swung outside the house and their feet lowered into the hold of the vessel through the hatchways. The conveyors carry the grain to the turnhead spouts from which it passes to the storage bins, and thence through the floor valves of the bins to the cars placed beneath them. Under such conditions they are called "marine elevators," and when the mechanism is mounted on a barge or float to permit of its being moved from place to place, it is commonly known as a "floating elevator." A carload of 1,200 bushels is delivered in about three minutes.

To load grain from an elevator into the grain-carrying vessels of the Great Lakes, the vessel is made fast alongside the house, and its hatches being removed, the grain is poured by gravity in a perfect torrent into its hold through great spouts which extend to the hatchways from the floor valves of the bins. The discharging capacity of these spouts ranges from 12,000 to 60,000 bushels per hour and load vessels of the greatest capacity in two or three hours. In the largest elevator, where the working house is separate from the storage house, the grain is spouted from the bottom of the bin on to a belt conveyor by which it is carried to the top of the working house where it is weighed and then delivered to the loading spouts.

The loading and storing capacities of individual elevators vary greatly according to their location. Innumerable small structures capable of handling only a few thousands of bushels each are located along the lines of railway traversing the grain-bearing regions of the Western States. These are owned and operated by the railroads. But at the large centres of flour manufacture and grain transportation, such as Minneapolis, Duluth and Chicago, are elevators of mammoth proportions, with individual capacities ranging from 500,000 to 5,000,000 bushels. One of the medium-sized elevators at Duluth is 285 feet long, 85 feet wide and 150 feet high. Nine belt conveyors driven by a 200 horse-power steam engine lift the grain to a height of 145 feet to the turnhead spouts. Each belt carries 125 buckets having a capacity of one peck each, so that the total load at any working instant is about 270 bushels or 15,000 pounds, representing an unloading capacity of 12,000 bushels per hour. The cleaning machines have an individual capacity of 3,000 bushels per hour, and the dryer house passes 2,000 bushels per hour. In many of these larger elevators the motive power is electricity, each machine having its own special motor.

Throughout the grain-producing regions of the West the co-operative elevator has become a very considerable factor in the handling of the country's grain crops. The movement began to take on substantial proportions in the year 1900. Since then these farmers' co-operative elevator associations have steadily increased until at the present time it is estimated that they handle nearly 40 per cent of the grain sent to market. These elevators are all small, but pay their owners dividends, which range up to 7 per cent, although the average would be nearer 3 per cent. Consult *Grain Dealers' Journal* ‘Plans of Grain Elevators’ (Chicago 1913); Ketchum, M. S., ‘The Design of Walls, Bins and Grain Elevators’ (New York 1911); Zimmer, P. G., ‘Mechanical Handling of Materials’ (New York 1905).

GRAIN INSECTS. Stored grain, corn, nuts, and the like, are frequently infested and injured by various insects. About 40 kinds of weevils (q.v.) lay their eggs upon dry grain, and their grubs bore into and devour the kernel, so that when they are numerous great damage may ensue. It has been estimated that the annual loss in the United States from this cause alone is about $40,000,000. The most important of these pests are the granary-weevil (*Calandra granaria*) and the rice-weevil (*C. oryza*). The former is wingless, evidence that it was domesticated ages ago. It multiplies so rapidly, developing from egg to adult in about six weeks, that five or six generations might be produced annually in a warm temperature. The rice-weevil has well-developed wings, which it seldom uses, showing a strong tendency to become wingless in time. Much injury to stored grain is also caused by other beetles, particularly by three species (*Silvanus surinamensis, Cathartus gemellatus* and *C. advena*), but they usually follow the attacks of other insects. The cadelle (*Tenebroides mauritanicus*) is to be included in this category, as it has a pernicious habit of gnawing into kernels of grain and destroying the embryo or germ. Great harm in granaries is done also by small moths related to the clothes-moth, whose caterpillars bind the grains together, forming clots, which both spoil the edible quality of the cereal and clog mill machinery. The most familiar of these is the European *Gelechia cerealella,* often called Angoumois grain-moth, but known as "fly-weevil" in the Southern States, where it is so prevalent that grain can nowhere be stored for a long time. Another imported grain-moth, troublesome in the United States since about 1890, is *Ephestia kühniella;* and a third (*Tinea granella*), is especially harmful to wheat in Europe, but not prevalent in America. Injury by the Angoumois grain-moth and the rice-weevil, which obtain entrance to the grain in the fields, can be largely prevented by early harvesting and by threshing as soon as possible. The standard remedy for all grain insects, however, is bisulphide of carbon, applied at the rate of one or two ounces to every 100 pounds of infested grain, which is effective in proportion to the tight closing of the bins. Exposure should last as long as possible, unless the seed is desired for planting, when an exposure of 24 hours is sufficient and will not detract from the germinating power. In buildings that cannot be tightly closed a larger quantity of the insecticide must be used, and repetition of treatment is necessary in warm weather at intervals of six weeks or more. Frequent stirring about of the grain is helpful against these insects; and granaries whenever emptied should be thoroughly cleaned and whitewashed. See Flour and Meal Insects.

GRAIN-POISONING. See Ergotism.

GRAIN STANDARD ACT. This act of 11 Aug. 1916 authorizes the United States Secretary of Agriculture to investigate the handling and grading of grain and to establish standards for corn, wheat, rye, oats, barley, flaxseed and other grain. On the establishment of any such standard the law prohibits the shipment, or delivery for shipment, in interstate or foreign commerce originating in the United States, of any grain sold, offered or consigned for sale by grade without previous inspection and grading by a licensed inspector, at the place of shipment, at the destination or at some point in transit, provided there is a licensed inspector located at the point of shipment or destination. In this latter case the grain may be shipped without inspection; and if there is any dispute over the grading of it, the matter may be referred to the Secretary of Agriculture by either of the parties to the transaction. The act provides for a public notice of not less than 90 days in advance of the date on which any new standard shall become effective. The object of the law is to provide a uniform system of grading staple crop products, and in this way affording the farmer incentive to improve the quality of his product by the careful selection of varieties, skilful culture and effective methods of harvesting and handling. Many of the States have passed similar laws and ranged themselves by the side of the Federal legislature for the improvement of standards in grain.

GRAINING. (1) In leather manufacture the process of rubbing leather with a board to raise the grain. The leather having been shaved to a thickness at the beam and daubed is hung up to dry, and is then folded, grain side in, and rubbed on the flesh side with a pommel or crippler to give the leather a granular appearance and render it supple. The hide is then extended and rubbed on the grain side. This is termed bruising. Also a process for giving markings to the surface of leather to imitate the wrinkled appearance of morocco, hog-skin and some other leathers.

(2) In painting, the imitation of the natural grain of wood by means of tools. Combs, brushes, rollers and the corner of a folded rag are used in making the various patterns.

(3) In lithography, a mode of giving a certain texture to the face of a stone. One stone is laid on another with a quantity of sifted sand of a given fineness, and by a peculiar oscillation and gradual progression the surface is cut into a set of fine prominences more or less deep and distant, according to the character of the work to be placed on the stone.

GRAKLE, grăk'l, the name of several kinds of birds. In the United States the blackbirds (especially the larger ones) of the family *Icteridæ*. (See Blackbird). In India and eastward a mina-bird (q.v.) or some related bird formerly classified in the miscellaneous group *Gracula*.

GRAMINEÆ, grā-mĭn'ę-ē. See Grasses.

GRAMMAR is the systematic treatment of the expression of thought by means of language. Grammar is often called a science, but in its present state it cannot rank with sciences like astronomy, or chemistry, for instance. For one thing, it has not the power of prediction. Adams and Le Verrier, the one in France, the other in England, were able, from observed disturbances in the solar system, to determine that there must be a yet undiscovered planet, and to calculate its orbit and position so accurately that observers, turning their glasses on the specified locality in the heavens, found the planet Neptune. Grammar has no such power. All the linguists of Europe could not have predicted in advance of discovery what the Chinese language would be like; nor could all the linguists of the world determine what would be the language of some people of unknown origin who might be discovered to-morrow. The laws of chemistry appear to be universal. The same elements exist in the stars, the planets and the sun, as upon the earth, and so far as our knowledge yet reaches, only the same. Helium was first discovered by the spectroscope in the sun, but by later research found upon the earth. Hydrogen and oxygen will combine in the very same proportions to form water in India as in Europe. But grammar can command no such certainty. Its facts change from tribe to tribe, from dialect to dialect and with most puzzling and baffling variations. The crossing of a mountain or a river throws the scholar into some new system of grammatical construction. Hence grammar for practical purposes must be viewed chiefly as a constructive art. In no department of learning is there less room for dogmatism. The scholar cannot say what shall be, or what should be. He does well if he can discover and clearly explain what is. The "rules" of grammar in any language can be no more than the statement of the existing facts of that language, as scholarship has discovered, and has been able to co-ordinate them.

It is obvious that language must have existed long before grammar. Man would find means of intelligent expression long before he could give systematic explanation of the reason for various forms of expression. In fact, the earliest grammar known to the modern world is the Sanskrit grammar of Panini (about 300 B.C.), giving in 8 books, with 3,000 sections, the rules for classical Sanskrit. But Panini himself enumerates 64 grammatical predecessors, and the oldest Sanskrit literature is conventionally placed at 1500 B.C., though undoubtedly much older. A language, however, must exist in a tolerably complete form before a literature can be composed in it, so that the Sanskrit language reaches beyond the earliest Sanskrit literature far back into a dim antiquity. The language had existed for unknown centuries, and had been the medium of a great literature for probably a thousand years before its grammar began. The impulse of the Sanskrit grammar was religious, for on the correct rendering of any verse of its sacred books salvation might depend. Greek grammar had an independent and later origin. Its impulse was philosophical and literary. The Homeric poems were the monuments it most eagerly studied. But those poems are placed at 1100–900 B.C., while the first notable, though disconnected, observations on grammar were made by Plato (427–347 B.C.), and Aristotle (384–322 B.C.), carried grammatical analysis so far as to distinguish *nouns, verbs* and *connectives*. It was not until Dionysius Thrax ("The Thracian"), who taught in Rome in the 1st century B.C., composed his 'Art of Grammar,' that the grammar of the Greek language had full development. Thus again about a thousand years elapsed after the fullness and power of the Greek language had been revealed in the 'Iliad' and 'Odyssey,' before grammatical analysis was ready to explain what the language had long since done. The record of English grammar is similar. The first really English grammar was claimed by William Bullokar, who published in 1586 'A Brief Grammar for English,' which he said was "the first grammar for English that ever was, except my grammar at large." Ramsey, 'English Language and English Grammar' (pt. I, ch. 3, p. 49).

In 1652 John Wallis published his 'Grammatica Linguae Anglicanæ,' explaining English usage in Latin, as did other so-called English grammarians, who still esteemed Latin, as the only scholarly tongue. The earliest of these works was written 500 years after the Norman Conquest and two centuries after Chaucer had shown what the English language by itself could do. Everywhere we find grammar working upon a language already made, and rich enough in words and forms to be the vehicle of a literature before the grammarians submitted it to examination and analysis. Everywhere the office of grammar has been, not to fix what a language should be, or must be, but to explain what an already existing language is. Grammar is explanatory and not creative.

So considered, grammar may be defined as the art of expressing thought by means of connected words. Grammar has nothing to do with unconnected words. We may have a very extensive list of words without grammar, as the names in a city directory; but when we connect them in statement,— as if we say, "George Jones precedes John Jones in alphabetic order," — grammar at once begins.

Some very learned authors have stated as an axiom that "The sentence is the unit and starting-point of speech." How this idea originated is difficult to understand. It is not a self-evident truth, for one may say, as some have said, that "the name of an object is the unit and starting-point of speech," and this statement is as good as the other until the contrary is proved. The account in Genesis reads: "And out of the ground the Lord God formed every beast of the field, and every fowl of the air, and brought them unto Adam, to see what he would call them: *and whatsoever Adam called every living creature, that was the name thereof.*" Gen. ii, 19.

There is nothing illogical or absurd in this idea that language began with the names of objects. Others have thought that *verbs*, expressing action, came first. Still others have preferred to think that language began with involuntary exclamations, which we now call *interjections*. No one of these theories is self-evidently true or false. The statement that "the sentence is the unit and starting-point of speech" is equally far from being a self-evident truth. In fact, it is a late result of complicated reasoning. If true, it must be proved to be true,— what are the proofs? In every generation millions of children, starting with absolutely nothing, learned their native language. Now, in the acquirement of the modern

European languages, at least; children everywhere learn the language by isolated words. It is a triumph when the little one can say, «Papa» or «Mama,» or whatever is the accepted equivalent of either, and apply the name intelligently to the right person. This is the most usual «starting-point of speech,» and there is no thought or imagination of a «sentence» about it. Then come names of familiar objects, as «water,» «bread,» «milk,» etc.; then names of common animals, perhaps called according to the sounds they utter, as «doggie» or «bow-wow,» «kittie,» «birdie,» etc. Whoever sees much of the home life of other peoples will find the French, German or Italian mother teaching her baby in precisely the same way, word by word, object by object. It is an event when the little one passes beyond this, and forms its first sentence, as «Mama come,» «doggie run» or the like. The construction of a sentence marks a distinct advance of the baby's thought after a considerable store of separate words has been acquired.

The same is true of the learning of a foreign language by an adult. The «conversation-books» of ready-made sentences are the standing joke of travelers. In real life the sentence one has carefully memorized never fits the actual circumstance, and the person addressed never gives the reply that the book prescribes, so that in a moment all is mental confusion. But one who will learn useful isolated words of a foreign language can make himself understood long before he can construct a coherent sentence. If the English-speaking man entering Italy, for instance, will learn certain simple words, as *acqua* (water), *caffe* (coffee), *latte* (milk), *pane* (bread), *Camera* (room), and some 30 to 50 other words or simple phrases, with the numerals and names of coins, he can go all through Italy, communicating sufficiently for ordinary purposes, and gradually learning to construct sentences.

Grammar thus treats almost wholly of the forms, relations and connection of words. The matter is thus stated by one of the most philosophical of modern grammarians: «Grammar, or the doctrine of language, treats of the laws of speech, *and in the first place of the Word, as its fundamental constituent.*» Maetzner, 'English Grammar,' Vol. I, p. 12.

There is no grammar of sentences, except when two or more sentences are united in one complex or compound sentence. Pages may be covered, or a volume might be filled, with perfect sentences, no two of which are grammatically connected, and — *as finished sentences,* — grammar has nothing to do with them. The first thing that grammar does to a sentence is to take it to pieces to break it up into its component parts, the words of which it is framed, and then to show how these are connected to form that composite thing which we call the sentence.

Words, so viewed, are appropriately classified as «parts of speech.» These parts of speech may vary in different languages, but in the Indo-European languages, including Greek, Latin, Italian, French, German, etc., in the Semitic languages, as Hebrew and Arabic, and in other groups, they are practically identical, showing that the division so widely prevalent is a natural and logical one. In English grammars, and in grammars which English-speaking men have compiled for other languages, these parts of speech retain, with slight change of form, the names given them by the ancient Latin grammarians. The parts of speech are, in the order of their importance:

1. *The Noun,* or name of an object, whether a material object manifest to the senses, or immaterial, manifest only to the mind. The distinction between *concrete* and *abstract* nouns is metaphysical, but not grammatical. Grammar treats the names of abstract conceptions like *love, hate, kindness,* precisely as it treats the names of material objects like *rock, fish, flower.* All alike are nouns. Whatever one can think of as existing may be named by a noun.

2. *The Pronoun.*—A word that may, on occasion, stand in place of, or as the representative of, a noun.

3. *The Adjective.*—According to its name, an *added word,* expressing some quality of an object, while leaving the noun unchanged to stand for the general type.

4. *The Verb.*— This may be described in general phrase as the *action-word.* Even those verbs that express a state of being express it with a suggestion of action or movement, so that «Time *exists*» presents to the mind a more vivid and living idea than the noun-phrase «The *existence* of time.» The importance ascribed to this part of speech is shown by the name which the old grammarians gave it. The Latin *verbum* means simply «word» and they called the action-word *Verbum* — pre-eminently «The Word» as controlling in all expression of thought. No sentence can be constructed and no complete thought be expressed without a verb.

5. *The Adverb.*—A word which intensifies or shades down the meaning of a verb and has a like effect on an adjective or on another adverb. It has an especial office as denoting place (as *here, there, everywhere*) or time (as *now, then, never*). In such use adverbs often become connectives, binding clauses together (as *where, when, whence,* etc.), and are then often called «conjunctive adverbs.»

6. *The Preposition.*—A particle, often very slight in form (as the English *of, in, with*; Greek *ek* or *ex, en, syn;* Latin *ex, in, cum*), showing some relation of a noun or pronoun to almost any other part of speech, as to a noun, pronoun, adjective, verb or adverb — indicating any one of various relations, as of direction, origin, dependence, etc.

7. *The Conjunction.*—A particle simply joining words, not as expressing relation, but addition or contrast (of which simple forms in English are *and* and *but*). Conjunctions also connect phrases or sentences (clauses), either in the relation of equality (*co-ordinate conjunctions,* as *and, but*) or of dependence (*subordinate conjunctions,* as *if, since, though, unless*).

8. *The Interjection.*— One of the spontaneous utterances of emotion, as of joy, grief, anger, surprise, etc. It is a dictum of grammar that «The interjection is independent of all grammatical relation,» yet it often strongly influences the entire meaning of a sentence, as in the exclamation, «*Oh,* that my people had hearkened to my voice!» where the omission of the «Oh» would make the sentence almost meaningless.

These parts of speech and their uses vary in many ways in different languages. Thus the Latin or Greek noun can often dispense with the preposition, the meaning of which is expressed by a changed form of the noun. The Latin verb can largely dispense with the pronoun, since person and number are sufficiently indicated by special forms of the verb. The verb in some languages has more modes (or moods) than in others, as the Greek *optative* (the *wishing* mode) is not found in Latin or in English. The number of tenses varies greatly. While the Greek, Latin and English tenses mark quite strictly the divisions of time, as past, present and future, the tenses of the Semitic languages, as Hebrew and Arabic, denote only completed or uncompleted action. The Anglo-Saxon, too, had but one form for the present and future, as we still say, in English, “I *sail* for Europe to-morrow.” But, though the details are different, the general scheme is one. The department of grammar that deals with the parts of speech has received the conventional name of *Etymology*.

Syntax (from the Greek *syn-tasso*, to “arrange in order,” as the ranks and divisions of an army, is the name given to the department of grammar that treats of the due ordering of words in the construction of the sentence. Here the one demand that must in some way be met in every language is, that the sentence shall clearly indicate: (1) What is spoken of; (2) What is said about it.

These indispensable constituents of the sentence we name the *subject* and the *predicate*. All the devices of grammar have no other end but to keep these absolutely clear, adding incidentally to either such force or effect as may be possible.

In seeking this result one of the chief elements to be determined is, whether the subject of the sentence is to be viewed as the subject or the object of the action; as, “The *engine* draws the train,” or “The train is drawn by the *engine*.” This gives for the verb the *active* and the *passive* voice and for the noun or pronoun the various *cases*, as the *Nominative* or the *Objective* (also called the *Accusative*) case. Other cases may indicate other relations. In an inflected language like Greek, Latin and others, the cases are indicated by the form of the noun or pronoun, which may, accordingly, be placed almost anywhere in the sentence. In an uninflected language, like English, as there is little distinction of form, the case-relation is ordinarily determined only by the position of words, so that the *order of words* becomes a grammatical element of supreme importance. In the inflected languages it is necessary to learn a vast number of forms (declensions, conjugations, etc.) in order that the meaning intended may be correctly expressed. In an uninflected language grammar spends its force in the due adjustment of largely unchanging forms for the same purpose, that the meaning intended may be correctly expressed. The task and the triumph of grammar in any language is to teach such combination of words in sentences that the thought of speaker or writer shall be conveyed without change or loss to the mind of hearer or reader. See GRAMMAR, ENGLISH; LANGUAGE, SCIENCE OF.

Consult Benfey, ‘Geschichte der Sprachwissenschaft’ (Munich 1869); Baumann, ‘Sprachpsychologie und Sprachunterricht, eine kritische Studie’ (Halle 1906); Bernard-Leroy, ‘Le langage, essai sur la psychologie normale et pathologique de cette fonction’ (Paris 1905); Finck, ‘Die Sprachstanime des Erdkreises’ (Leipzig 1909); Giles, ‘Manual of Comparative Philologie’ (London 1901); Mauthner, ‘Die Sprache’ (Frankfurt 1906); Nausester, ‘Denken, Sprechen und Lehren’ (2 vols., Berlin 1901–06); Moncalm, ‘Origin of Speech and Thought’ (London 1905); Paul, ‘Prinzipien der Sprachgeschichte’ (4th ed., Halle 1909); Tucker, ‘Introduction to the Natural History of Languages’ (London 1908).

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GRAMMAR, English. The first principle here to be established is that in English grammar we are dealing with the English language. English grammar cannot be built up by inferences from other languages. For instance the Greek had a definite, but no indefinite, article; the Latin had no article whatever. Would English have one article or none? The Anglo-Saxon had two articles. Would English follow that? The Anglo-Saxon had a dative case and many another modification which English has dropped. How do we know that English may not have also dropped the article? Conjecture and inference give us no result. We are driven back to a study of facts. What does English have? So we learn that, as matter of fact, English has two articles, the definite and the indefinite. The same might be shown in numberless instances. English grammar is not a system that can be built up by a priori reasoning, but is simply the correlation of the observed facts of English usage.

It has been the misfortune of the English language that in all the early days its grammar was not so treated. The grammatical treatment of the language was begun about the time of the Tudors by Latin scholars and the first textbooks were even written in Latin. English was still regarded as an inferior language — “the vulgar tongue” — and must be shaped as nearly as possible to the model of classical Latin. Even Lindley Murray in 1795 contrasts English with “the learned languages,” which for him were notably the Latin and Greek. But English differs from the ancient classical tongues as it does also from most of the leading modern languages, in an almost complete absence of *inflection* — that is, of changes in forms of words to indicate their relations. The eminent English scholar, Dr. George P. Marsh, says in his ‘Origin and History of the English Language’: “A truly philosophical system of English syntax cannot be built up by means of the Latin scaffolding, which has served for the construction of all the continental theories of grammar, but must be conceived and executed on a wholly new and original plan.”

The long-prevalent and futile attempt to shape an uninflected language upon an inflected model cannot be too soon nor too completely abandoned. English must be recognized as a grand language which has started anew in the world, which is built upon a model of its own, not to be shaped to the pattern of any other: and which has proved its right to an independent place by a noble literary history of 500 years, including in its array of masters of philosophy and science, of statesmen, historians, orators and poets, some of the greatest names of all time; and which has proved itself an effective means of communication by its extension over more than one-fourth of the habitable earth and its use as their vernacular by some 180,000,000 of its inhabitants.

Here stands among the nations the language which has done all this. What are its methods of expression? The rational and direct answer to that question constitutes English grammar. A sufficient definition is that *English grammar is the correct use of English words in English sentences.*

We find, then, as matter of fact, that English possesses the eight parts of speech common in other European languages: ***noun, pronoun, adjective, verb, adverb, preposition, conjunction*** and ***interjection.*** This can be shown to be a very logical division of words, but we accept it, not because it is logical, but because it exists. Some competent grammarians count nine parts of speech by treating the article as separate from the adjective. Nouns and pronouns are credited with the four properties of *gender, person, number* and *case.*

Gender in English is strictly limited to the distinction of sex or of the lack of it. Thus there are three genders. Males are ***masculine,*** females are ***feminine*** and inanimate objects, as of no sex, are ***neuter.*** That is all there is of gender in the language. But it is sufficient. One of the greatest achievements of the English language is the abolition of what is called *grammatical gender,* which in other languages generally prevails. The triumph is so complete that an English-speaking person does not see how any other system could be possible, until he learns what is actually done in other languages.

Grammatical gender is gender arbitrarily imposed upon words without the slightest reference to sex. In French, Italian and Spanish there are but two genders, so that every noun must be either masculine or feminine, even though it may denote an inanimate object. German has three genders, but they are applied in the most indiscriminate way, without any reference to sex in the objects named. Thus, *weib,* meaning «woman, wife,» is neuter; so is ***Mädchen,*** «maiden.» *Kopf,* «head,» is masculine; but *Auge,* «eye,» is neuter; *Arm,* «arm,» is masculine, but *Hand,* «hand,» is feminine, while *Finger,* «finger,» is masculine.

«A German gentleman writes a masculine letter of feminine love to a neuter young lady with a feminine pen and feminine ink on masculine sheets of neuter paper, and encloses it in a masculine envelope, with a feminine address to his darling, though neuter, Gretchen. He has a masculine head, a feminine hand, and a neuter heart. A masculine father and feminine mother have neuter children.»—Earle, ‹Philology of the English Tongue› (ch. VII, p. 377).

How such a system was ever fastened upon any language is one of the puzzles which the most eminent linguists have not been able to solve, but from the entire complication English has shaken itself free. To know the gender of an English noun, it is only necessary to know its meaning.

The most obvious relations of sex are denoted by independent *words;* as *man, woman; husband, wife; boy, girl; son, daughter; brother, sister;* etc. But *wife* is not a feminine form of the word *husband,* nor *daughter* a feminine form of *son,* nor *sister* of *brother.* The words are not at all related in form, but only in meaning, and we know them as masculine or feminine only by knowing what they mean.

A small number of special feminines are formed directly from masculines by the ending *ess,* derived from the French; as, *abbot, abbess; actor, actress,* etc. From *hero* we have *heroine,* derived from the Greek. We have also a very few rarely used words from the Latin in *tor,* which form feminines in *trix;* as *executor, executrix.* But these endings do not of themselves constitute feminine nouns, for we have addr*ess,* fortr*ess,* mattr*ess,* quarant*ine,* cicat*rix,* which are all neuter. No English noun can be classed as masculine, feminine or neuter, merely by its termination.

The number of nouns with special feminine endings is constantly diminishing. In the time of Queen Elizabeth such words as *butleress, warrioress, waggonness* and many similar forms were used, which have long since disappeared. Others are constantly falling into disuse. It is not now good form to say or write *authoress, poetess* nor *songstress.* We refer to the woman, like the man, as *author, lecturer, poet, singer,* etc. The genius of the language tends strongly to the disuse of all distinctively masculine or feminine terminations. We even speak of a woman as the *chairman* of a meeting, or as a *postmaster* in the United States mail service, In literary work a woman may be an *editor,* but never an *editress.* In a college she may be *president* or *professor,* but never *presidentess* nor *professoress.*

A small number of masculines and feminines are made by masculine or feminine prefixes, as *he*-goat, *she*-wolf, *man*-servant, *maid*-servant, etc. But this method is passing out of use, so that the number of such forms remaining is now very small.

Even in nouns denoting living beings, English minimizes gender. There is a great class of nouns like *friend, neighbor, stranger, citizen, patriot, assistant, helper,* etc., that unquestionably denote living beings, but give no indication of sex. If a person says, «My *friend* started for home yesterday,» it is impossible to judge from that statement whether the «friend» was man or woman, boy or girl. But we cannot say that the noun «friend» is of neuter gender, like «rock» or «tree.» The noun «friend» simply waives the question of gender, makes no affirmation about that matter, but leaves the gender undetermined or indeterminate.

Thus we have a multitude of such familiar nouns as *accountant, acquaintance, advocate, amanuensis, assailant, assistant, associate, attorney, citizen, clerk, companion, comrade, cousin, enemy, foe, friend, historian, interpreter, maniac, monarch, nurse, patient, person, physician, relation, relative, reporter, secretary, sovereign, witness;* practically all the uncounted nouns in *er,* the number of which is increased without limit at any one's pleasure; as *buyer, doer, driver, giver, hearer, interviewer, intruder, invader, joker, keeper, locker, maker, mocker, packer, prowler, questioner, reader, receiver, singer, speaker, stenographer, stranger,* *voyager, worshipper, writer;* all nouns in *ist* as *antagonist, artist, chemist, copyist, geologist, pianist, psychologist, zoologist;* most nouns in *or,* as, *author, contractor, counsellor, doctor, editor, orator, visitor;* most names of animals; as *ape, bear, beaver, bird, butterfly, deer, elephant, elk, fowl, goat, locust, monkey, mule, ostrich, robin, shark, sparrow, swallow,* and innumerable others quite innocent of gender. This non-gender terminology is becoming the prevalent style in English. The fullest list of unrelated word-pairs denoting gender contains only about 70 such words, while the nouns with feminines is *ess* or *trix* do not probably number more than 75 now in approved use. It will be seen that these are incalculably outnumbered by the nouns denoting living beings without specifying gender, of which the list given in this paragraph furnishes but a few specimens.

These nouns indeterminate in gender are often said to be of *common gender,*— a phrase to which there is no special objection, and which has the advantage of being widely and generally understood, as signifying that the word it describes may be either masculine or feminine.

This use, which has limited place in many languages, but which is predominant in English, is in accord with the law of practical efficiency, *not to load down our speech by mention of unnecessary things.* If we say, «That is an error of the *typewriter,*» it is not of the slightest importance whether the «typewriter» is a man or a woman. Any one who should explain the sex, and say «That is an error of my typewriter who is a young man,» — or, «who is a young lady,»— would make himself ridiculous. Why, then, should he be required to give this useless information by a *masculine or feminine form of the word?* The very thing for practical purposes is a word that has no gender, and gives no indication of sex. The entire tendency of the English language is to banish from its grammar all distinctions of gender except where such distinction is absolutely necessary. This is a great advantage on the score of freedom and simplicity, as well as of the highest linguistic efficiency.

Person, in English nouns, is practically negligible. No noun can be used in the first person without a pronoun of the first person accompanying it. Such forms as «I, *Paul,* say unto you» are correct, but very rare; «*Paul* say unto you» would be impossible. No noun will be understood to be in the second person, unless by some plain indication of direct address. Nothing in the form of the noun can mark it as of first or second person. That is, *all nouns are in the third person unless an accompanying pronoun or other special indication marks them as of first or second.*

Number, as singular or plural, is indicated with special care. On the threshold we meet a conflict of definition, some authorities defining the plural as «denoting more than one»; others, as «denoting two or more.» Between these definitions come certain fractional quantities. Shall we say «One and a half *ton was* delivered» or «One and a half *tons were* delivered»? The prevailing usage is certainly in favor of the latter form in accordance with the predominant authority of the best modern dictionaries which treat the *plural* as denoting *more than one.*

The general or regular form of the plural of nouns is obtained by adding *s* to the singular. Where the singular ends in a sibilant sound as *ch, s, sh, x* or *z,* an *e* is inserted for the sake of euphony, as in *churches, bushes, gases, foxes,* etc. This formation of the plural by adding *s* or *es* is so general and so simple that children readily learn it, and incline to use it for all nouns, saying, for instance, *mouses* until taught to say *mice.* There is a very small list of irregular plurals; there are also certain exceptional ones, as of foreign nouns, which may be readily learned by some portion of the pains and care required for learning anything.

Case in English nouns is very slightly indicated. There are but *two* case-forms, and but *one* change of form for case in either singular or plural. This will startle many who have learned that every noun has *three* cases, *nominative, possessive* and *objective.* But a moment's thought will show that the regular or common form of the noun undergoes but *one change* in the singular as, *fox, fox's.* We use the regular or common form as the subject of a verb, or as the object of a verb or of a preposition at pleasure, but in so using it we do not change it in the slightest degree. The only change of form for case in the singular number is by the adding of *'s* for the possessive. The possessive of a regular plural differs from the nominative only by the slight addition of the apostrophe (') in writing or printing. Even this disappears in the spoken language, where *foxes'* is indistinguishable in utterance from *foxes.* A few irregular plurals form their possessives by adding *'s,* as to a singular. Thus we say or write *men's* hats; *children's* shoes, etc.

The pronoun is the stronghold of *gender.* But for the pronoun, gender might be wholly ignored in English grammar. The two sentences «The *man* spoke,» and «The *woman* spoke,» differ in meaning, but they do not differ at all grammatically; in each we have a noun as the subject of a verb. But the moment we use a personal pronoun, gender becomes important: «The *man* spoke *his* mind», «The *woman* spoke *her* mind.» The pronoun alone has English gender in its keeping.

Yet gender is indicated in pronouns only in the personal pronoun of the third person and singular number. Pronouns of the first person,— *I, my* or *mine, me, we, our* or *ours, us,* — or of the second person,— *thou, thy* or *thine, thee, you, your* or *yours,* are utterly indeterminate in gender. It is only when we come to the forms of the third person that we find gender in *he, his, him, she, her, hers, it, its,*— and there only in the singular number. The moment we pass to the plural,— *they, their* or *theirs, them,*— we lose gender again. Pronouns other than personal, as demonstrative, relative or interrogative,— *this, that, who, which, what,* etc., give no sign of gender. All notification of gender that grammar need take cognizance of is found in the eight pronoun-forms, *he, his, him, she, her, hers, it, its.*

Case is fully developed only in the pronoun. Six pronouns, the personal pronouns,— *I, thou, he, she,* and *it,* with their plurals, and the relative pronoun *who,* are the only English words that have distinct forms for the objective case. The only objective *forms* in the English language are *me, us, thee, him, her, them* and *whom*,— seven in all. The neuter pronoun of the third person singular, *it*, and the plural of the second person, *you*, are the same in nominative and objective, in modern use. The older English would have added *you*, the nominative being *ye*, but that usage is now obsolete. The seven objectives above named are the only words that can be in the objective case independently of position in an English sentence; as:

> *Him* th' Almighty Power
> Hurled flaming, headlong from th' ethereal seats.
>
> *Whom* he would he slew, and *whom* he would he kept alive.

The English *adjective* has no gender, number, person nor case. How much this means, the English-speaking man never realizes until he studies some foreign language, where he finds that, however well he may know a noun, he is powerless to use it with article or adjective, until he knows the gender of that noun, and has settled that one of the varying forms of adjective or article which may properly be used for that noun in that particular gender, number, and case,— which is almost an endless study. By sweeping gender absolutely away from all adjectives (including the definite and the indefinite article) English has completed the emancipation of the language from the oppressive burden of grammatical gender. By the absolute simplicity of the contrivance, all perplexity is banished, and error is made impossible. This is a wonderful linguistic triumph.

The English *verb* has very little inflection. A few verbs undergo some internal change in the past tense and past participle; as, *go, went, gone*. The prevailing system simply adds *d* or *ed* to the present to make the past tense and past participle (which are thus identical in form). The first system has been called, after Grimm and other German philologists, the *strong*, and the second the *weak* conjugation — fanciful names, not generally favored by leading English and American grammarians, but often severely condemned. A common and more intelligible classification designates the forms in *d* or *ed* as *regular*, because they follow the prevailing rule or custom, and those otherwise made as *irregular*, because they are few in number, and vary in arbitrary ways, for which no rule can be given. The irregular verbs afford one of the best illustrations of the statement that English grammar is simply the study and mastery of concrete facts. Those verbs can be learned only by arbitrary memory. It is no more possible to reason out the forms of an irregular verb than to reason out the name of a stranger who is passing on the sidewalk. But there are very few of them. Out of at least 8,000 verbs in the English language all but about 200 form their past tense and past participle by adding *d* or *ed* to the root-form. Every new verb is at once and without question so conjugated; as, *telegraph, telegraphed; corral, corralled*, etc. Also, the number of irregular verbs is constantly, though silently, decreasing. In one list of 215 irregular verbs, 47 are marked as having also the regular form, so that we may say either *awaked* or *awoke, burned* or *burnt*, etc.; and it will be found that in many of these the regular is fast supplanting the irregular form.

Aside from these variations for the past tense and past participle, the most numerous and constant inflections occur in the use of the second person singular — the forms with *thou*. But it is precisely those forms that modern English has discarded. *Thou*, with its associated verb-forms, has passed entirely out of common English speech or writing, being found only in the older literature, in the language of Scripture, of prayer, etc., and rarely in poetic, oratorical or literary style that is intentionally made archaic. It is found that all these forms can be adequately taught and easily learned in a special department of «The Ancient or Solemn Style,» and the ordinary conjugations of the verb flow on unvexed by their inflections. Thus the past tense of *do* is the one word *did*, and of *have* the one word *had*, for all persons and numbers in present use.

Omitting, then, the forms used with *thou*, we find that in dispensing with verb-inflections the English language has broken all precedent. The varying forms of Latin and Greek verbs are counted by hundreds. But (omitting, as above stated, what may be called the «thou system»), the most complicated English verb, the verb *be*, has but eight inflected forms, *be, am, is, are, was, were, being, been*. The verb *be* is alone in this number of inflected forms. No other irregular verb has more than five inflected forms; as, *give, gives, gave, giving, given*. A regular verb has but four inflected forms; as, *love, loves, loved, loving*. The modes and tenses, that express the manner and time of action, are for the most part formed by auxiliary verbs, *be, can, do, have, may, must, shall, will*; and when the forms and combinations of these eight auxiliaries are once learned, they are the same for all our thousands of English verbs.

English syntax is determined by the lack of inflection in the language. An inflected language, as the Latin or the Greek, for instance, could put a noun almost anywhere in the sentence, because the form of the noun would show whether it was the subject or the object of the verb or otherwise accounted for. But in English whether a noun is subject or object of a verb can ordinarily be known only by its position, as subject when preceding, or as object when following the verb. The same is true of most pronouns, seven objective pronoun-forms — *me, us, thee, him, her, them* and *whom* — being alone independent of this rule, since these alone show by their form the relation they bear to the verb or to a preposition. Since in English the adjective has no change of form for masculine, feminine or neuter, for nominative, possessive or objective, singular or plural, the connection of the adjective can likewise be known only by its position, as immediately preceding or following its noun. So the adverb must be placed as close as possible to the verb, adjective or other adverb it is to modify. Many ridiculous constructions arise from a neglect of this requirement.

Some view such an exposition with amazement that is almost dismay. They are ready to exclaim, «Is this all that English grammar has to offer — position»? Hence many carelessly say the «English has no grammar,» and Richard Grant White deliberately entitled it «The Grammarless Tongue.» This is as if one whose whole idea of numerical notation had been formed by Roman numerals were to be suddenly introduced to the Arabic system. He has been accustomed to writing a special letter or group of letters for each number, I, II, III, IV, V, VI, VII, VIII, etc., and you tell him that the figure 1 has no meaning except by position; that it may mean one unit or ten or a hundred or a million or a million million units, according to its place in the line; or that, on the contrary, it may mean one-tenth, one-hundredth or one-millionth of a unit in a certain position after the period. Instead of his complicated system you offer him 10 digits and *position*. In fact, it took the world a considerable time to become sure that this simple system would be adequate. Now mathematicians tell us that the stellar distances could never have been computed by the Roman numerals. The simple decimal system of notation by position is a necessity for intricate calculations; yet, because of its simplicity, children learn it in a surprisingly short time. English speech has rules, just as the Arabic notation has rules; and they are not in either case less imperative because they are simple.

In every sentence there is an *essential subject* (often called the *grammatical subject*), without which the group of words would not form a sentence. This essential subject is commonly known by its position, just as the 1 in 1,000,000 has value by its position. Something is settled by elimination, as the object of a preposition cannot be the subject of the sentence. We say, «The man with his friends *was* (not were) present» because «friends,» as the object of the preposition «with,» cannot affect the verb. Similarly the object of a participle cannot be the subject — «The writer, seeing the difficulties, *gives* (not *give*) his consent.» «Writer» is there the only possible subject.

In like manner there is some one verb (often called the *predicate verb*) which is the *essential predicate* (or the *grammatical predicate*), without which the group of words would not form a sentence. Around the *essential subject* and around the *essential predicate* may be grouped other words or phrases, forming the *complete subject* and the *complete predicate* respectively. When these are settled we have exhausted the grammar of the simple sentence. If two or more simple sentences are conjoined, we have only to settle the construction of each as a *simple sentence* (commonly then called a *clause*); after which we have only to see that these *simple sentences* are properly combined to form the most extended *compound* or *complex sentence*.

The process is not the less worth while because it is simple. The very perfection of our best systems of efficiency is their simplicity. No manager would recommend his system as admirable because it was complicated. English grammar is the systematic ordering of English words for expression of thought, and the proper knowledge of that system is the best aid to clearness, force, and beauty in the expression of thought.

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GRAMMAR SCHOOLS. The term grammar school is generally used at the present time to denote a school maintaining a full elementary or preacademic course and housed in a building or buildings by itself separate from the high school or academic department. Less frequently a school having only the seventh and eighth grades is called a grammar school. The term is usually not employed except in a city or large village.

The course of study in a grammar school is essentially the same as that commonly prescribed in the rural school or the elementary department of the village high school which usually includes both elementary and academic departments. The difference is in the number of studies offered, the length of time given to class periods, and, in rural schools, the number of classes or grades instructed by a single teacher.

The subjects usually taught in the grammar school are reading, arithmetic, elementary English (including composition, oral and written, grammar and literature), geography, elementary United States history, physiology and hygiene, drawing, music, and in the more fully equipped schools, cooking, sewing and manual training. More or less physical training is also usually included in the course of study. In an occasional grammar school there are taught the beginnings of certain subjects which in the past have ordinarily been considered as belonging in the high school. These subjects are Latin, modern languages, algebra and elementary general science. Graduation from the grammar school implies adequate preparation for high school work.

The typical grammar school offers eight years or grades of work, with, in many instances, a year in the kindergarten where pupils, usually not more than six years of age, are given preliminary training before beginning the regular first year school work. An occasional grammar school has nine grades, at times using nine years to complete the work ordinarily done in eight, and more frequently including some high school work in the grammar school course.

The number of teachers varies greatly. There are seldom less than eight, one to a grade, although in small outlying schools one teacher may instruct two grades. A typical city grammar school has from 16 to 32 teachers. Each of the eight grades is divided into sections according to the number registered, and a teacher is assigned to each section. The number and arrangement of sections varies greatly to correspond to local needs. According to common practice, one or more sections of each grade does the first half of the year's work while the remaining section or sections is doing the second half. This organization makes possible a series of 16 steps rather than eight in the course, and permits closer adjustment to the needs of individual pupils.

The size of a school depends chiefly on two factors: The density of population, since little children cannot be expected to walk far to school, and the number of teachers whose work can be effectively supervised by one principal. If the number is less than about 16 it is not good economy to pay the salary required to secure the highest type of supervising principal; if it is more than 32 it will be impracticable for one man to supervise properly unless assisted by departmental supervisors. With such assistance, the number of teachers may be largely increased.

Registration in each room normally varies from 25 to 50. The ideal registration is probably from 30 to 35.

Recent developments in school organization tend to change the number of grades in the elementary school from eight to six and to organize a so-called junior high school consisting of what has been in the past the two upper grades of the elementary school and the first year of the high school. For a full explanation of the reasons for this change see the article on the JUNIOR HIGH SCHOOL.

RANDOLPH T. CONGDON.

GRAMME, the standard unit of French measures of weight. A gramme=15,432 grains troy. See METRIC SYSTEM.

GRAMOPHONE. A sound-reproducing apparatus invented by Emile Berliner and the basis of all disc phonographs. In principle it is similar to the phonograph (q.v.) and the graphophone (q.v.), but in its original form differed from these by employing a glass disc coated with lampblack instead of a cylinder of wax for its record. This disc carries a stylus connecting with a diaphragm which is vibrated by the sound-waves, and records those vibrations upon the lampblack surface in the form of a long spiral, as the disc is revolved in a horizontal plane. Unlike the record cylinders of the phonograph or graphophone, the disc cannot be used directly to reproduce the sounds thus recorded, and for that purpose a corresponding disc of hard rubber, prepared from a metal die photo-mechanically etched from the original markings on the lampblack coating of the glass disc is employed. In its subsequent development the method of making and reproducing records has been assimilated to that for cylinder phonographs.

GRAMPIANS, GRAMPIAN HILLS, or **GRAMPIAN MOUNTAINS.** (1) The chief mountain system of Scotland, extending across the country from southwest to northeast, for a distance of about 150 miles, and roughly regarded as the dividing line between the Highlands and Lowlands. Its limits are not well defined, but it may be said to commence near the southwest end of Loch Awe, on the west coast of Argyleshire, where the main ridge runs, in a well-marked course, along the northern boundaries of Perthshire to Cairn Ealer, where it separates into two distinct branches — one stretching north-northeast on the north side of the Dee, and terminating near Huntly; the other running nearly due east on the south side of that river, and terminating in the neighborhood of Stonehaven. Among its peaks are Ben Nevis, the highest mountain in Scotland, 4,406 feet; Ben Cruachan, 3,689 feet; Ben Lomond, 3,192 feet; Ben Lawers, 3,984 feet; Schiehallion, 3,547 feet; Ben Macdhui, 4,296 feet; Cairngorm, 4,084 feet; Cairntoul, 4,241 feet. The more remarkable passes are those of Aberfoyle, Glenshee and Killiecrankie. The principal rivers rising in the Grampians are the Tay, Forth, Spey, Don and Dee. The range takes its name from the Graupius Mons of Tacitus, the scene of Agricola's defeat of Galgacus in 86 A.D. (the site of which is unknown) and its mistaken rendering «Grampius.»

(2) A low range of mountains in the western part of Victoria, in Australia, are called Grampians.

GRAMPUS, or COWFISH, a genus of porpoises of the family *Delphinidæ*. The species inhabiting the North Atlantic (*Grampus griseus*) reaches a length of about 12 feet. The head is globose, with a slight indication of a beak; the lower jaw shorter than the upper; dorsal fin high and falcate. The upper surfaces of the body are gray in color, the belly grayish white. The body is usually marked with numerous, irregular, light-colored lines which are believed to be due to the attacks of the cuttlefish. The young have the front of the head yellowish white, and six or seven vertical white lines on the sides. There are from 6 to 14 rather large, blunt teeth in the lower jaw, but none in the upper jaw. On the Atlantic coast of North America the grampus accurs singly or in small schools, ranging southward to New Jersey. It also occurs on the coasts of Europe. A closely allied species (*G. Stearnsii*) inhabits the north Pacific, and the genus has been reported from the Cape of Good Hope and New Zealand. The grampus feeds upon cuttlefish, and yields oil of superior quality. The name grampus (from the Italian *gran pesce*, meaning simply «large fish») is applied also to various other cetaceans, and especially to the killer whale (*Orcinus orca*) and to the blackfish (*Globicephala*).

GRANADA, Fray Luis de, Spanish writer and orator: b. Granada 1504; d. Lisbon, 31 Dec. 1538. His father died while Luis was still a child leaving the family without resources and his mother did the washing at the monastery of Santo Domingo, the inmates of which extended help to her in other ways. The boy showed an early precocity which attracted the attention of Count Tendilla, who gave him permission to study with his own children. At the age of 20 Granada joined the Dominican order and giving up his family name of Sarria, he assumed that of his native city, Granada. In the monastery which was, in those days, a sort of university, Granada followed all the courses given and outdistanced all of his fellow students. He showed special talent as an orator. Even among the brilliant students of the monastery he became so noted for his numerous talents that he was crowned with the greatest honor the institution could bestow upon him. In June 1529, after finishing his course at the monastery, he was elected honor student of his alma mater in the College of Valladolid. On the completion of a brilliant course, broad, far-reaching and deep in its significance, he returned to the monastery of Granada as a teacher of higher studies, especially philosophy and theology. In Granada he soon acquired a reputation as a preacher and orator that surpassed that already acquired as a student and teacher. Thousands of all classes flocked to hear him and among his hearers he made many influential friends who served him in good stead when he was appointed head of the dilapidated monastery of Scala Cœli in the mountains of Cordoba. In the latter Fray Luis gathered about him a body of earnest young monks zealous for the good of the Dominican order, and with their aid and that of his influential friends and the good will of the community, he succeeded in making Scala Cœli one of the most notable monastic centres of Spain. There he composed some of his most important works. After eight years of labor there he was appointed preacher and priest to the Duke of Medina-Sidonia at his palace in Sanlucar. This position he relinquished to undertake the task of founding a great Dominican monastery in Badajos, in which he was brilliantly successful, due principally to his oratorical ability and his talent for organization. In this new convent he wrote 'Guia de pecadores,' a work which met with great favor not only in Spain but in all Christian countries. Scarcely had he finished his task in Badajoas when Fray Luis was invited to Portugal by the royal cardinal archbishop of Evora. So great was his success as an orator in Portugal that the Portuguese showered upon him all the favors permitted by the order; and in 1557 he was elected to the high position of provincial of Portugal, which made him head of all the Dominican monasteries and establishments in the country. At the end of his term of office during which he was very active in erecting and improving monasteries and otherwise advancing the interests of the order, Frav Luis returned to Lisbon to convent life, having refused the appointment of archbishop of Brega offered him through the queen of Portugal whose confessor he had been. He died shortly afterward of a fever contracted through mal-nutrition, the result of his ascetic life.

Fray Luis de Granada set a higher standard of Spanish prose than any of his contemporaries or predecessors. Among his published works are 'Guia de pecadores'; 'Libro de la oración y medilación'; 'La vida Cristiana'; 'Simbol de la Fe'; 'Doctrina Cristiana'; 'La vida del Padre Maestro Avila'; 'Vida de Milicia Fernández'; 'Vida de Dona Elvira de Mendoza'; 'Conceptus Mundi'; 'La escala espiritual de San Juan Climaco.' For works and biography see Volumes VI, VIII and XI of the *Biblioteca de autores españoles* (Ravadeneira).

GRANADA, grä-nä'dą, (1) an ancient kingdom, subsequently a part of southern Spain, bounded by Andalusia, Murcia and the Mediterranean. It was included in the Roman province of Boetica, and after the Saracen invasion became an independent Moorish kingdom until it was conquered by Ferdinand and Isabella in 1492, when it became one of the 13 old provinces; it had an area of 11,100 square miles, and since 1833 is divided into the provinces of Granada, Almería and Málaga. (2) The modern province, with a coast line of 66 miles on the Mediterranean, has an area of 4,928 square miles. It is picturesquely diversified by mountains and valleys, the chief range being the Sierra Nevada, which attains a maximum altitude of 11,781 feet in the Cerro de Mulhacen, the loftiest summit in Spain. The province watered by the Guadalfeo, the Jenil and Darro is comparatively fertile and well cultivated; and abounds in mineral wealth. Pop. (1900) 492,460; in 1917 about 534,000. The capital is (3) Granada, the ancient metropolis of the Moors. It is romantically situated on the rivers Darro and Jenil, at the foot of the snow-capped Sierra Nevada, which forms a background to the crescent-shaped city, with its terraced streets, turrets and gilded cupolas rising above each other, the whole crowned by the Alhambra (q.v.), the famous citadel-palace of the Moorish rulers. After the Moors had been forced to abandon the rest of their Spanish dominions they held out for 250 years in the old kingdom of Granada, and during that period were able to adorn their capital with this famous palace, which represents the highest achievement of Moorish art in Spain, just as the mosque at Córdova stands for the Arab genius. «Though the one style proceeds out of the other,» Mr. Royal Tyler writes, «and the superficial resemblances are many, the real differences go very deep. If nobility be the ideal, there is no doubt as to which is the greater; and nature has done well to enhance Granada's charms by the wonderful setting furnished by the Sierra Nevada, for otherwise the struggle would have been too unqual. As it is, the Alhambra will remain for most people the culminating glory of all Spain.» The gardens of the Alhambra are surpassed by those of the Generalife, a delightful place on a neighboring hill. The city itself contains very few vestiges of Moslem times, but has a lovely Renaissance cathedral, by Diego de Siloe, which possesses much good sculpture by Alonso Cano and others. Adjoining it is the Capilla Real, which shelters the tombs of Ferdinand and Isabella. The Granadine school of painters and sculptors in the 16th and 17th centuries included, beside Alonso Cano who has been mentioned above, Pedro de Mena, José de Mora and Atanasio Bocanegra, whose work may be studied not only in the cathedral but also in the churches of San Juan de Dios, San Jeronimo and the Cartuja. Other noteworthy buildings are the archiepiscopal palace and the residence of the provincial captain-general. Granada is the seat of a university founded in 1531, of several colleges, a normal school and a school of art. It has various manufactures of local importance only, such as silks and woolens, leather, paper, hats, etc. Founded by the Moors before 800, near the site of the ancient Illiberis, and from 1036 to 1234 included in the kingdom of Córdova, in 1235 it became the capital of a new kingdom, and attained almost matchless splendor. In 1491 it remained the last stronghold of the Moors in Spain, and mustered 60,000 men to resist Ferdinand and Isabella. The defense proved unavailing and the besiegers took possession in 1492. A year later it was made the seat of an archbishopric. The great body of its inhabitants still were Moors, and its prosperity continued almost without diminution till 1610, when it declined with the decree expelling the Moors from Spain. Pop. about 78,000.

GRANADA, Nicaragua. (1) City, capital of the department of Granada, on Lake Nicaragua and the Pacific Railroad of Nicaragua. It was founded in 1524 and was formerly the chief town of the republic, but has suffered greatly from the civil wars. It is a trading centre for dyewoods, cacao, gold and silver filigree hand-made ornaments and hides. Pop. 17,092. (2) The department of Granada lies between the Pacific and Lakes Nicaragua and Managua; area about 2,600 square miles; highest peak, Mount Mombacho, an extinct volcano.

GRANADILLA, the edible fruit of certain tropical species of passion-flowers (q.v.).

GRANARY, The, an ancient burial ground in Boston, Mass., in Tremont street. Here are buried Paul Revere, Samuel Adams, John Hancock, Peter Faneuil, Chief Justice Sewall and several of the old colonial governors of Massachusetts.

GRANBERY, John Cowper, bishop of the Methodist Episcopal Church South: b. Norfolk, Va., 5 Dec. 1829; d. Ashland, Va., 1 April 1907. Graduated Randolph-Macon College in 1848, he entered the Methodist ministry in that year, was a chaplain in the Confederate army in 1861–65 and in 1875–82 professor of moral philosophy and practical theology in Vanderbilt University. His publications include ‹Twelve Sermons› (1896) and ‹Experience the Crowning Evidence of the Christian Religion› (1900).

GRANBURY, Tex., town, county-seat of Hood County, on the Brazos River, the Fort Worth and Rio Grande Railroad. The chief manufactures are flour and farm implements. It has a cotton-gin, oil mill, ice plant and is a trade centre for the products of the surrounding agricultural region. Pop. 1,336.

GRANBY, Canada, town on the Yamaska River in Shefford County in the province of Quebec, on the Central Vermont Railway, 55 miles southeast of Montreal and also on the Montreal and Southern Counties Electric Railway. There are rubber, comb, sash and door and chair factories, and carriage works. Pop. 4,750.

GRANBY TOKEN (1737), a private copper coinage issued by John Higley of Granby, Conn., where there were copper mines afterward used as Tory prisons and workshops. The obverse was a deer, with the legend «Value Me as You Please»; Roman numerals III and crescent. The reverse was three hammers on a triangular field, each surmounted by a crown, and with the legend «I Am Good Copper.»

GRAND, Sarah, pseudonym of FRANCES ELIZABETH CLARKE, English novelist: b. Ireland. When 16 she married Lieutenant-Colonel M'Fall (d. 1898), with whom she traveled in India, China and Japan; in 1901 she visited the United States. She has been active in the woman's movement in England. The first novel that gave her reputation was ‹The Heavenly Twins› (1893). Her other writings include ‹Singularly Deluded›; ‹A Domestic Experience›; ‹Our Manifold Nature› (1894); ‹The Beth Book› (1897); ‹The Modern Man and Maid› (1898); ‹Babs the Impossible› (1900); ‹Emotional Moments› (1908); ‹Adnam's Orchard› (1912); ‹The Winged Victory› (1916).

GRAND ARMY OF THE REPUBLIC, a patriotic association, organized in the interest of the surviving representatives of the military and naval forces of the Civil War, the families of those dead, and such objects as they think cognate with these. The membership is of soldiers and sailors of the war, honorably discharged or continuing, and State militia on active duty subject to national call during that time. It was organized in Illinois in the winter of 1865–66, by Dr. B. F. Stephenson and Rev. W. J. Rudolph, the surgeon and the chaplain of the 14th Illinois Infantry; the first post was organized at Decatur, Ill., 6 April 1866; the first national «encampment» was held at Indianapolis, 20 Nov. 1866. Its assigned objects are fraternity, commemoration and assistance among the above classes; and it has aided in establishing soldiers' homes and memorials, and maintaining and educating soldiers' orphans. It also caused the institution of Memorial Day. It ruled in 1869 that it should not be used for partisan work, nominations or debates, but naturally it has been a powerful factor in political calculations and the shaping of party conduct regarding both nomination of candidates for office and legislative action. It has also given out strong utterances against restraining liberality in pension legislation, and has used its influence to prevent official restriction in the expenditure of money under such legislation. It has headquarters in Cincinnati, and in 1916 reported 5,452 posts throughout the country, almost every State being a department with a commander. The membership was 159,863; it was once over 400,000. The deaths, during the year ended 31 Dec. 1914, were 11,434. There is a national council of administration of 44 members. It holds annual meetings or encampments in the chief cities; the uniform is dark blue with black slouch hat. Its badge is a bronze star hung from a strap and ribbon flag; on the star in relief are a soldier and sailor clasping hands in front of a figure of liberty, with two freemen in the foreground, the United States flag on the sides. Consult Beath, R. B., ‹History of the Grand Army of the Republic› (New York 1889) and Wilson, O. M., ‹The Grand Army of the Republic under its First Constitution and Ritual› (Kansas City, Mo., 1905). See WOMAN'S RELIEF CORPS.

GRAND CANYON, Ariz., also called the grand canyon of the Colorado River in Arizona to distinguish it from the grand canyon of the Yellowstone (see YELLOWSTONE NATIONAL PARK), from the profound gorges cut by the Green and Grand rivers, from Marble Canyon, etc. It was set aside 11 Jan. 1908 as one of the «national monuments» administered by the Agricultural Department; the area of the reservation is 806,400 acres; the gorge is 217½ miles in length, 4,000 to 6,000 feet deep, and in width at the top varies between one or two miles and quite 15 miles. If we include the Marble Canyon, its less profound neighbor, the chasm's total length is increased to 283 miles. A publication of the Department of the Interior contains an excellent account of Major Powell's famous adventure which culminated here. For hundreds of miles the Colorado and its tributaries form a mighty network of mighty chasms which few had ventured even to enter. Of the Grand Canyon, deepest and hugest of all, tales were current of whirlpools, of hundreds of miles of underground passage and of giant falls. The Indians feared it. Even the hardiest of frontiersmen refused it. It remained for a geologist and a school teacher, a one-armed veteran of the Civil War, John Wesley Powell, to dare and to accomplish. That was in 1869. Nine men accompanied him in four boats. There proved to be no impassable whirlpools in the Grand Canyon, no underground passages and no cataracts.

But the trip was hazardous in the extreme. The adventurers faced the unknown at every bend, daily embarking upon swift rapids without guessing in what great falls such rapids might terminate. Four men deserted, hoping to climb the walls, and were never heard from again — and this happened the very day before Major Powell and his faithful half dozen floated clear of the Grand Canyon into safety. Charles Dudley Warner called the chasm "by far the most sublime of all earthly spectacles." Professor Van Dyke wrote: "More mysterious in its depth than the Himalayas in their height, the Grand Canyon remains not the eighth but the first wonder of the world." To geologists it seems primarily a masterpiece of erosion. See NATIONAL PARKS AND MONUMENTS.

GRAND CANYON OF COLORADO RIVER. In crossing the high plateau region of southern Utah and northern Arizona, the Colorado River has cut the greatest canyon in the world. It is more than a mile deep in places and the deeper portion is about 200 miles long. It is not only the most notable scenic spectacle of its kind, but a remarkably clear and impressive exposition of geology, presenting many features that can be readily understood. The rocks are bare, and while most of them are in thick beds lying nearly level some are tilted at various angles. They represent a long portion of geologic time from the Archæan, or oldest known, to the late Carboniferous, but deposits of Ordovician, Silurian and most of the Devonian ages are absent. These rocks constitute cliffs and buttes of great variety of form and much brilliancy of color, forming a most stupendous and beautiful spectacle. The features presented illustrate most clearly the titanic process of nature's sculpturing, not only in the present configuration but in the former land surfaces of earlier geologic times.

The term Grand Canyon is applied to that portion of the canyon of the Colorado River which lies in northern Arizona. It is in the midst of a wilderness and inaccessible from most directions, but the Atchison, Topeka and Santa Fe Railroad has a branch line to its southern rim at a locality where some of the finest features are visible. Here are hotels from which trips can be made along the rim and down trails to the river's edge. Some views in this vicinity are given in the plates herewith. The altitude here is 6,866 feet above sea-level; at the river just north it is 2,355 feet; on the farther rim to the north it is 8,000 feet.

Few persons can realize on first view that the canyon is nearly a mile deep and from 8 to 10 miles wide. The cliffs descending from the rim form a succession of huge steps, each 300 to 500 feet high, with steep rocky slopes between. These cliffs are the edges of hard beds of limestone or sandstone, while the intervening slopes mark the outcrops of softer shales. These beds are more than 3,500 feet thick and they lie nearly horizontal. Far down in the canyon is a broad shelf caused by a basal hard sandstone; it is deeply trenched by the narrow inner canyon cut a thousand feet or more into the underlying Archæan "granite."

The rocks of the canyon walls vary in color from white and buff to bright red and dull green. They present a marvelous variety of picturesque forms fashioned mainly from erosion by running water, the agent which has excavated the canyon.

The Colorado River, one of the largest in North America, rises in the Rocky Mountains in Colorado and Wyoming and empties into the Gulf of California. In the Grand Canyon it is about 300 feet wide and 30 feet deep, flowing about 2 miles an hour with an average volume of 20,000 cubic feet a second. During freshets the depth, velocity and volume are greatly increased. In its course of 42 miles through the central or deeper part of the canyon the river falls about 500 feet or 12 feet to the mile. The water contains much sediment, especially in time of flood. Every rain fills the side canyons with rushing torrents which carry into the river a heavy load of debris from the adjoining slopes. Thus has the canyon been excavated and the deepening and widening is still progressing. It began at the surface of the plateau and it will continue until the river reaches a grade so low that it can no longer move the débris; meanwhile the side streams will widen the canyon until its sides become gentle slopes. Under present conditions and without further uplift of the country this will require a million years or more.

The rocks exposed in the walls of the Grand Canyon underlie a wide area of the Arizona Plateau and most of them extend far beyond. The first 3,700 feet of beds, all of which lie nearly horizontal, are as follows:

LIST OF STRATA FROM RIM TO GRANITE, ETC., IN WALLS OF GRAND CANYON.

			Feet
Carboniferous	Limestone, light colored, partly cherty, mostly massive (Kaibab)		800
	Sandstone, light gray, massive, cross-bedded, (Coconino)		300
	Sandstones and shales, all red (Supai formation)		1,100
	Limestone, massive, light blue-gray, but surface mostly stained red (Redwall)		550
Cambrian	Shale, with limestone and sandstone layers	Tonto group.	800
	Sandstone, hard, dirty gray to buff (on granite)		150

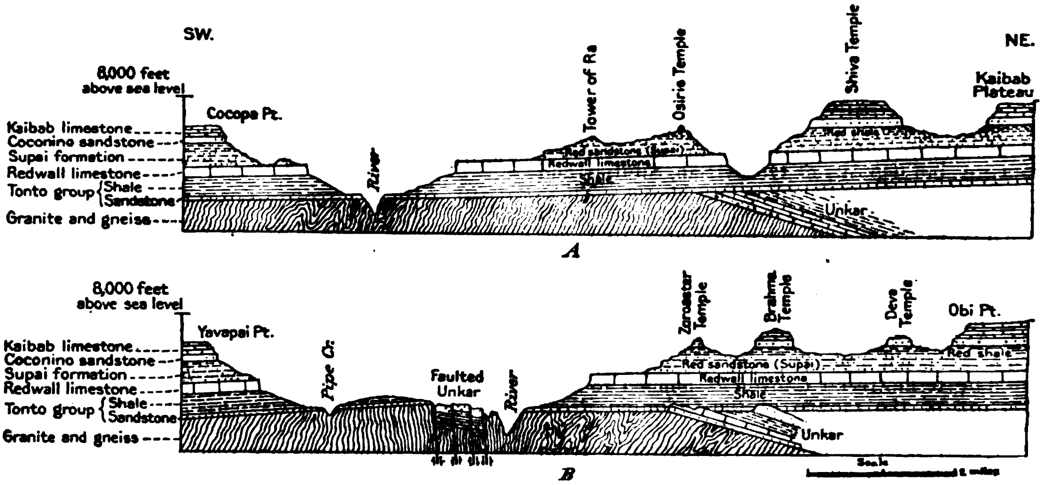
These formations are readily recognized by their color or character as they are practically uniform in aspect and relative position from all points of view.

The relations of these rocks are shown in the views and in the following cross sections: Fig. A.— Section across Grand Canyon from El Tovar Hotel through Buddha Temple to Kaibab Plateau. Fig. B.— Section across Grand Canyon near El Tovar, looking west.

The top limestone, Kaibab, caps the plateaus on both sides and the highest buttes. The outcropping edge of the Coconino sandstone is marked by a distinct band of light gray all along the canyon walls and capping some buttes 700 to 800 feet below the top. The red beds of the Supai formation everywhere constitute the middle slopes and many buttes, usually presenting a series of relatively small terrace-like steps. The conspicuous cliff below these, and stained red by their wash, is the hard massive Redwall limestone. It projects in many flat-topped spurs, buttresses and outliers isolated by erosion. The Tonto group, next below, forming slopes and a platform, is recognized by its greenish color.

For many miles the shelf of this sandstone of the Tonto group is cut through by a steep inner gorge which descends to the river 800 to 1,000 feet below, and exposes granite and gneiss of the original earth crust. At certain localities Algonkian rocks lie between the Tonto and the granite and they occupy a wide area northeast of Grandview. They consist of 12,000 feet of limestone, sandstone, red shale and lava, known as Unkar and Chuar group. These beds dip at moderate angles and on their irregular surface, which was land in earlier Cambrian time, lies the shale of the Tonto Group.

The first white men to see the Grand Canyon were Cardenas and his 12 companions, who were guided to the rim by Hopi Indians in 1541. Nearly 330 years later the first trip ever made down the river was accomplished by Maj. J. W. Powell. He left Green River, Wyo., 24 May 1869, in small boats and had a perilous and exciting but entirely successful passage. A memorial to Major Powell has been erected by the government on the rim at Sentinel Point. Since his pioneer effort this hazardous journey has been made by a few others, among them a party surveying for a proposed railroad, a project since abandoned. The Grand Canyon is included in a forest reserve and has also been created a national monument administered by the United States Department of Agriculture.



Sections across Grand Canyon of Colorado River near El Tovar Looking West.

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N. H. Darton,
Geologist, United States Geological Survey.

GRAND FALLS, or COLEBROOKE, Canada, port of entry, in Victoria County in New Brunswick, on the Canadian Pacific and Grand Trunk Pacific railways, 202 miles from Saint John. It is on the Saint John River, which is navigable to this point. The falls, which give the name to the place, are about 80 feet in height. Considerable trade is carried on in agricultural products. It is a tourist and sporting centre. Pop. 1,280.

GRAND FALLS, a cataract of the Grand River, in Labrador, British America. These falls are in a canyon of the Grand River, 25 miles long and nearly 500 feet deep. About four miles above the falls the river begins a rapid descent of 200 feet to the falls, where the precipice is 320 feet deep and 200 feet wide. Below the falls is another rapid descent of about 300 feet, and then a gradual descent to the ocean. The total descent from the beginning of the first above the falls to the ocean is about 2,000 feet. This canyon was discovered in 1839 by a Hudson Bay Company official named McLean; but no further report being made, its existence became a memory until 1891, when it was rediscovered and in 1894 surveyed by the Canadian Geological Survey. See Grand River.

GRAND FORKS, N. D., city, county-seat of Grand Forks County, on the Red River of the North and the Red Lake River, and on the Northern Pacific and the Great Northern railroads, about 25 miles west of Crookston and 320 miles northwest of Saint Paul. It was settled in 1871 and incorporated in 1881. It is situated in an agricultural, cattle and hog-raising and dairying region. Its chief manufactures are meats and packing-house products, flour, sash and doors, candies, creamery products, foundry products, bricks and steam-boilers. The United States census of manufactures for 1914 showed within the city limits 32 industrial establishments of factory grade, employing 462 persons; 343 being wage-earners receiving annually $288,000 in wages. The capital invested aggregated $1,346,000, and the year's output was valued at $1,816,000; of this, $819,000 was the value added by manufacture. In addition to the trade in its manufactured articles it has a large trade in live stock, wheat, oats and potatoes. The city has five banks with an aggregate capital and surplus of $800,000. It is the seat of the North Dakota State University, opened in 1884, the Wesley College of Music, Saint Bernard's Academy and the Grand Forks School of Music. Two large business universities are located here also. The public school system is excellent and progressive. Saint Michael's Hospital, the city building, the government building, the Y. M. C. A. building, Saint Michael's Catholic Church, the public library and the Presbyterian Church are among the principal buildings of the city. The city owns the electric-light plant for street lighting and the waterworks. In the last decade Grand Forks increased in population over 50 per cent. Pop. 15,000; including East Grand Forks, Minn. (directly across Red River), 17,426.

GRAND HAVEN, Mich., a port of entry, county-seat of Ottawa County, on Lake Michigan, at the mouth of Grand River, and on the Grand Trunk, Pere Marquette and Grand River, Grand Haven and Milwaukee railroads. It has an excellent harbor open the year around with steamship connections to Chicago and Milwaukee. The Grand Trunk operates two car ferries between Grand Haven and Milwaukee. A big trade is carried on in machinery, leather, fruits and grains. The principal manufactured products are automobile leather, steam engines and hoists, refrigerators, pianos, brass and iron castings, stampings, files and rasps, steel boilers and vessels. Large quantities of smoked fish, berries, grapes and celery are produced. The city was founded in 1835; it has three popular summer resorts, Highland Park, Spring Lake and Grand River. The form of city government is a modified commission plan with a mayor and city manager. It has municipal waterworks, electric plant, a public library, fine parks, electric railroad and radiating system of good roads. Fine high school and Akeley College for girls. Pop. 8,000.

GRAND ISLAND, Neb., county-seat of Hall County near the Platte River, on the Burlington & M., the Union P., the Saint J. & G. I. railroads, about 97 miles west of Lincoln and 144 miles southwest of Omaha. The first permanent settlement was made in 1862, and it was incorporated in 1872. It is situated in a fertile agricultural region. The chief manufactures are beet sugar, flour, canned fruits and vegetables, machinery, brooms, mattresses, fencing materials and chemicals. The United States census of manufactures for 1914 showed within the city limits 49 industrial establishments of factory grade, employing 608 persons; 460 being wage-earners receiving annually a total of $342,000 in wages. The capital invested aggregated $1,750,000, and the year's output was valued at $2,101,000; of this, $685,000 was the value added by manufacture. Large railroad shops for the Union Pacific Railroad are located here. There is an extensive trade in live stock and grain. The city is one of the largest horse and mule markets in the world, the sales annually amounting to about 40,000 head. Grand Island contains a number of wholesale establishments and is the distributing centre for a large section of the northwest of Nebraska. The State Soldiers' and Sailors' Home and Saint Francis' Hospital are located here. It is the seat of Grand Island College, opened in 1892 under the auspices of the Baptist Church, and it has a large free library. The present city charter, of 1901, provides for the election of a mayor every two years and a city council, in whom is vested the government. The city owns the waterworks and light plant. Pop. 11,505.

GRAND JUNCTION, Colo., city, county-seat of Mesa County, at the junction of the Grand and Gunnison rivers, and an important point on the Denver and Rio Grande and the Colorado Midland railroads. It is 4,560 feet above sea-level. It is nearly midway between Denver and Salt Lake. It is situated in a very fertile tract known as Grand Valley, and fruit, vegetables, alfalfa, beets and grain are raised in abundance. There are also a number of manufacturing industries, including a beet-sugar factory, flour mill, canning factory and meat packing factories, and there is a thriving trade in coal, lumber and bricks; a Carnegie library and Saint Mary's Hospital and a Y. M. C. A. and post-office. There are several fine parks. The city is surrounded by some of the most noted scenic points in Colorado. The waterworks are owned and operated by the municipality. Pop. 10,000.

GRAND JURY. See JURY.

GRAND LAKE, La., one of the shallow bodies of water in the southern part of the State, about 50 miles long. Its maximum width is about nine miles. Its chief inlets are Atchafalaya and Grand rivers, and Lake Vernet. Its outlet is Myrtle Bayou, which flows into Atchafalaya Bay, an arm of the Gulf of Mexico.

GRAND MANAN, mă-năn', an island at the entrance of the Bay of Fundy, off the coast of Maine. It belongs to Charlotte County, in New Brunswick, Canada; area, 36,552 acres. On the north coast, at Indian Beach, is a settlement of Indians. Fishing is the chief occupation, but the large forests still furnish material for ship-building and some lumber. The island is a favorite summer resort, because of its climate and the abundance of small game. Pop. 2,644.

GRAND MÈRE, grăṅ măr, Canada, town in Champlain County, province of Quebec, on the north side of the Saint Maurice River, 21 miles north of Three Rivers, on the Canadian Pacific and Canadian Northern railways. It is situated in a good farming district with excellent water-power facilities. Pulp and paper mills, sash and door factories, stove manufacture and bookmaking are the industries. Pop. 4,783.

GRAND OLD MAN, The, a name popularly applied to W. E. Gladstone (q.v.).

GRAND PRIX DE ROME, grăṅ prē dė rōm, prize given annually by the Academy of Fine Arts in Paris to the most successful competitor in painting, music, sculpture, architecture, etc. The winners of the prize become the charge of the government for four years and are sent to Rome to reside at the Villa Medici, the seat of the Académie de France à Rome. Each prizeman receives about $800 for his expenses, and is exempted from military service. The Prix de Rome was instituted by

Louis XIV in 1666 for the purpose of educating young painters and sculptors by a study of the Roman antiquities. Architects were admitted to competition in 1720. The institution was suspended for a time during the Revolutionary period, but was opened again in 1803 by Napoleon who enlarged it to admit musicians, medalists, engravers. During the Napoleonic régime the school was removed to the Villa Medici. Consult Baltard, 'La Villa Médicis à Rome' (Paris 1847). See École des Beaux Arts.

GRAND RAPIDS, Mich., city and county-seat of Kent County, second in State to Detroit in population and importance, is situated on both sides of Grand River, about 35 miles by rail from Lake Michigan, 152 miles from Detroit, 180 miles from Chicago; lat. 42° 57′ 49.02″ N., long. 85° 40′ 1.65″ W. Area 18.25 square miles.

Railroads.— The first railroad into Grand Rapids was the Detroit and Milwaukee (now a part of the Grand Trunk system), from Detroit to Grand Haven, in 1858. Since then have been built the Grand Rapids and Indiana, the Michigan Central, the Lake Shore, the Pere Marquette and three interurban lines. These roads radiate in 11 different directions, with through trains to all important Michigan cities and New York, Chicago, Cincinnati and Toledo. The Grand Rapids and Indiana and the Pere Marquette have extensive shops.

Industries.— Grand Rapids is the base of supplies and the distributing point for western and northern Michigan. It has large wholesale and jobbing houses in groceries, provisions, clothing, dry goods, millinery, carpets, crockery, drugs, paper, cigars, boots and shoes, knit goods, sporting goods, hardware, mill supplies and in other lines. The chief industry is the manufacture of furniture (see Furniture Industry). New York and Chicago in their order exceed Grand Rapids in the volume of their furniture production, but Grand Rapids is regarded as a leader in design, finish and quality. Semi-annually, in January for the spring season, and July for the fall, buyers come here from all parts of the United States and from foreign lands to inspect the new styles and to place orders. Between 300 and 400 manufacturers of furniture and kindred lines in other parts of the country semi-annually send their samples here for the buyers to inspect. The outside manufacturers occupy large furniture exposition buildings built for their use, in the heart of the city. Other important industries are the manufacture of plaster from gypsum beds under and near Grand River, knitting mills and textile industries, brass works, printing, manufacture of flour, machinery, carpet sweepers, etc.

Fruit-growing.— Grand Rapids is also the centre of the West Michigan fruit belt, which extends along Lake Michigan from Saint Joseph to Traverse City. With an average crop, the peaches, apples, pears and plums marketed here will exceed 1,300,000 bushels. This is also an important winter lettuce centre, Chicago, Cincinnati, Saint Louis and even New York drawing on the Grand Rapids growers for their supplies. One of the most popular varieties of winter lettuce originated here and is named the "Grand Rapids."

Banks.— The capital and surplus of banks and trust companies, September 1916, $6,935,000; capital, surplus and profits, $7,982,575; savings deposits amounted to $22,175,302; bank loans and investments, $40,785,479; total bank deposits, $42,389,693; bank clearings in 1915 amounted to $175,419,457.

Churches, Schools, etc.— Many Christian Church denominations are represented with congregations and churches. The bishops of the Grand Rapids Catholic diocese and West Michigan Protestant Episcopal diocese live here. The Catholics have a cathedral. The total value of church property is estimated at $3,620,500; the Catholics hold $1,217,500; Reformed Church in America, $223,500; Christian Reformed, $233,500; Methodist Episcopal, $218,100; Lutheran, $195,750; Presbyterian, $138,200; Congregational, $159,100; Baptist, $259,400; Protestant Episcopal, $207,350; there are also other and smaller denominations whose property is valued at $385,300. There are 37 public schools, including three high schools. Calvin College and Theological Seminary of the Christian Reformed Church is located here. The Catholics, Lutherans and Reformed churches have parochial schools accommodating about 8,000 pupils. The total school census in 1916 was 32,100. The Grand Rapids Public Library contained 167,028 volumes in 1916. It consists of the Ryerson library building (a gift to the city of his birth by Martin A. Ryerson of Chicago), and 41 branches and stations for circulating books. It is controlled by an elective board of five members. The museum, controlled by the same board, administers property valued at $76,000 and is especially strong in natural history specimens.

Public Institutions.— The Michigan Soldiers' Home, maintained by the State with accommodations for 1,000 veterans and 200 widows, is located three miles north of the city. There are three large hospitals, two orphan asylums and two homes for the aged.

Public Buildings.— The public buildings are city hall, valued at $452,000; courthouse, $300,000; Federal building and post-office, $700,000; county jail, $50,000; Ryerson library building, $506,000; museum, $76,000; police headquarters, $138,000.

Clubs and Societies.— The Peninsular Club owns a clubhouse in the heart of the city valued with real estate at $200,000. The Owashtanong Club has a clubhouse at Reed's Lake costing $60,000. The G. R. Boat and Canoe Club owns a clubhouse on Grand Rapids River at North Park valued at $25,000. The Kent Country Club owns 100 acres of land and a $15,000 clubhouse and the Highland Golf Club also own land north of the city. There is an Elks temple valued at $200,000; a Masonic temple at $500,000; Knights of Columbus building, $125,000 and the Loyal Order of Moose building, $30,000; the Germans have four clubhouses and halls; the Irish, the Danish and the Polish each one. The Ladies' Literary Club and the Grand Rapids Woman's Club, the West Side Ladies' Literary Club and the Saint Cecilia (musical) Society, all made up exclusively of women, own clubhouses. The Young Men's Christian Association owns and occupies a building that cost $250,000. The Grand Rapids Association of Commerce has 1,400 members.

Parks and Resorts.— The city has John Ball Park of 137 acres, the original 40 acres being the gift of John Ball; the Antoine Campau park of four acres, the gift of Martin A. Ryerson; Highland Park, 34 acres; Lincoln Park, 15 acres; Fulton Street Park and 25 other small parks, playgrounds and squares making a total of about 400 acres. Comstock Park of 100 acres, north of the city, is owned by the West Michigan Fair Association. Reed's Lake, three miles east of the city, and North Park, near the Soldiers' Home, are popular nearby summer resorts. The Lake Michigan resorts at Saugatuck, Holland, Grand Haven and Muskegon are one hour away by rail.

Public Utility.— The city owns its own waterworks, with Grand River as a source of supply; a filtration plant, ensuring an abundant supply of pure water and 229 miles of mains of all sizes; it also owns its own electric-lighting plant (furnishing light for some of the city buildings, city hall, library and schools), garbage burner and market. Seven bridges owned by the city span the river, two being of concrete construction and four of steel. Commercial lighting is furnished by the Grand Rapids Gas Light Company and the Consumers Power Company (electric), each company having a monopoly in its field.

Government.— Municipal affairs are conducted by a mayor, elected for a term of two years, and a council of 24 aldermen, two from each ward elected for two-year terms, half retiring each year. The fire and police departments, the health, the poor and the public works and parks are under the control of boards appointed by the mayor. The schools are under a board of nine members elected by the people, and the library and museum under a board of five members, also elected. The assessed valuation in 1916 was $163,726,341. On 29 Aug. 1916 the electorate approved a new city charter which provides for a commission-manager form of government, with seven commissioners, two elected from each of three districts by the city at large, and one chosen from the city at large. The city commission selects a city manager, who appoints a director of public service, a director of public safety and a director of public welfare. The city manager, with these three directors, exercise all of the administrative functions of the city, subject to the supervision and regulation of the city commission. The commission selects one of its members as mayor. This charter became effective the first Monday in May 1917.

History.—In 1826 Louis Campau established an Indian trading station here and in 1831, after the government survey, made the first entry of land. The first permanent settlement was made in 1833 by the Dexter Colony, of about 60 persons, which came from Herkimer County, N. Y. Grand Rapids was incorporated as a village in 1838 and as a city in 1850.

Population.— The Federal census of 1910 gave 112,571 which made Grand Rapids the 44th city in the United States. Estimated population 130,000 in 1917.

James Schriver,
City Clerk, Grand Rapids.

GRAND RAPIDS, Wis., a city and the county-seat of Wood County, on the Wisconsin River, the Chicago, Milwaukee and Saint Paul, the Chicago and Northwestern and other railroads, about 70 miles northwest of Oshkosh. The river is spanned by a fine bridge connecting with Centralia, a suburban municipality prior to 1900, when it was incorporated with Grand Rapids. It contains a public library, a hospital and several parks. Lumbering and agriculture are the chief occupations of the inhabitants and there are lumber, pulp, paper and flour mills, manufactures of furniture, boxes, wagons, ice machines, foundries and machine shops. In the neighborhood are deposits of kaolin. There is abundant water power. The Citizens' Co-operative Society owns and operates the waterworks, telephone, electric lighting and street railway systems. Pop. 6,521.

GRAND RAPIDS AND INDIANA RAILWAY COMPANY. This company, fifth in succession, owning a completed line of railroad starting at Fort Wayne, Ind., running thence northerly through the city of Grand Rapids and the western section of Michigan to the Straits of Mackinac, 366.51 miles main line, with spurs and branches in Michigan, aggregating 52.52, a total of 419.03 miles, had its inception first in January 1854, at Hartford, Ind., where a company known as Grand Rapids and Indiana Company No. 1 was formed with the idea of building a railroad from Louisville, Ky., to the Michigan pineries, but accomplished nothing more than locating a line from Hartford to the northern State line of Indiana, and also as far as Sturgis, Mich.

In May 1855 the Grand Rapids and Southern Railroad Company was organized in Michigan by the same interests to build a railroad from Grand Rapids to the Indiana State line, and consolidated with the first company in September 1855, forming Grand Rapids and Indiana Company No. 2. Upon this company the State of Michigan, by an act of 14 Feb. 1857, conferred the lands granted to the State by an Act of Congress 3 June 1856, to aid in the construction of a railroad from Grand Rapids to some point on Little Traverse Bay.

In June 1857 the Grand Rapids and Mackinaw Railroad Company and the Grand Rapids and Fort Wayne Railroad Company were created and consolidated, forming Grand Rapids and Indiana Company No. 3.

The first 13 years of the life of this enterprise is replete with failures to construct any portion of its line between Fort Wayne and Grand Rapids. With the aid derived from the bonds voted by the cities of Fort Wayne and Grand Rapids it finally completed in December 1867 the first 20 miles of road from Grand Rapids north to Cedar Springs. As early as 1860 and 1861 the company had made two mortgages, the first to secure $5,000,000 and the second $4,500,000.

On 30 Sept. 1869 a contract was entered into by the Pennsylvania Railroad Company, lessee of the Pittsburgh, Fort Wayne and Chicago Railway, the Continental Improvement Company and the Grand Rapids and Indiana Railroad Company, for an issue of $8,000,000 7 per cent bonds, secured upon the lands and road, running 30 years from 1 Oct. 1869 — $4,000,000 of which were guaranteed by the Pittsburgh, Fort Wayne and Chicago Railway Company and $4,000,000 unguaranteed. With part of the proceeds of these bonds and the proceeds of $3,000,000 of debenture bonds, the

Continental Improvement Company completed the road from Fort Wayne to Petoskey (Little Traverse Bay) in November 1873. The cost of road and equipment as per settlement contract was $10,848,250.

In June 1871 the Grand Rapids and Indiana Railroad Company took a lease for 99 years of the Cincinnati, Richmond and Fort Wayne Railroad, then building, and which was completed in December 1871, from Richmond, Ind., to Adams (five miles east of Fort Wayne), 86 miles, to be used as an outlet south of Fort Wayne for the traffic of the Grand Rapids and Indiana Railroad.

The Continental Improvement Company, under a contract with the Traverse City Railroad Company, dated December 1871, completed the Traverse City Railroad from Traverse City to Walton Junction, 26 miles, in December 1872, and this road was leased to the Grand Rapids and Indiana Railroad Company for 50 years from January 1883, rental being net earnings, which were guaranteed to equal annual interest on first mortgage bonds, $250,000.

In June 1881 the Grand Rapids, Indiana and Mackinaw Railroad Company was organized in the interest of the Grand Rapids and Indiana Railroad Company for the purpose of extending its road from Bay View to Mackinaw City. This portion of the line was open for operation in July 1882. This company was consolidated with Grand Rapids and Indiana Company (No. 3) in October 1884, under the name of Grand Rapids and Indiana Company (No. 4).

The Bay View, Little Traverse and Mackinaw Railroad Company, line from Bay View to Harbor Springs, Mich., six miles, completed its road in 1882; was sold under foreclosure proceedings in February 1888, and purchased at sale by the Grand Rapids and Indiana Railroad Company, which owned all its stock and bonds.

The Muskegon, Grand Rapids and Indiana Railroad Company was organized in the interest of the Grand Rapids and Indiana Railroad Company in February 1886. The road was completed from Muskegon to Grand Rapids, 37 miles, in December 1886, and leased to the Grand Rapids and Indiana Railroad Company for 99 years from time of its completion, June 1886, rental being net earnings, which were guaranteed by the lessee to be equal to the fixed charges (interest on $750,000 5 per cent bonds), and 20 per cent of gross earnings of all business interchanged; but the excess of expenditure over earnings forced the sale of the Grand Rapids and Indiana Railroad under foreclosure 10 June 1896.

A new company was organized as the Grand Rapids and Indiana Railway Company, was incorporated in Indiana and Michigan in July 1896, and commenced operation of the road 1 Aug. 1896, with a capital stock of $6,000,000. Of this, $4,291,000 was exchanged for third mortgage 5 per cent bonds, and $1,500,700 for debts, and also provided for a second mortgage of $5,000,000 (2 per cent first year, 3 per cent two years and 4 per cent thereafter), of which $3,962,000 were exchanged for second mortgage bonds and certain debts of the old company; the remainder held in treasury for necessary betterments to the property in its then depleted condition.

By economical management and wise expenditures for betterments and additions, the company was enabled to make a slight return in the shape of dividends to its shareholders, first in 1900, beginning with 1 per cent and now paying 3 per cent; but is confronted by such hostile legislation in Michigan, both in the reduction of its passenger fares and increased taxation to such an extent that it is a serious question whether it can continue the small return to those who furnished the capital, so long in advance of its needs, to develop western Michigan and northern Indiana. Dividend of 3 per cent was continued until April 1910, since when no dividends have been paid.

GRAND REMONSTRANCE, a document of protest against misgovernment, drawn up by the House of Commons on 22 Nov. 1641 and presented to Charles I of England on 1 Dec. 1641. The causes leading up to this written protest were many, and its passage, by a majority of 11, by the House after a long, stormy debate, was undoubtedly hastened by the outbreak of rebellion in Ireland, and also the absence of the king, who at the time was in Scotland. The Puritan leaders had become disgusted with the intrigues carried on by the king with the Earl of Montrose, and in this document the grievances were set forth in such a manner that they were in fact an indictment of the whole governmental policy of the king. The imprisonment of members of Parliament without cause, the billeting of soldiers, the high-handed methods of the Star Chamber, High Commission and the Council of the North, the excessive abuses of the commercial monopolies and the unwarranted extension of the royal forests, as well as other minor grievances, in all 204 sections, were the points discussed in the manifesto. In it were also asked the appointment of new ministers, and that to a synod of learned divines be given the task of Church reform. King Charles ridiculed the document when it was presented for his consideration; on 10 December gave an indirect reply to the criticisms contained therein in shape of a proclamation on religion; on 15 December it was published; on 23 December answered the petition in an extremely evasive manner; on 3 Jan. 1642, before the House of Lords, impeached the leaders in the Commons who were most opposed to him, and who had been most instrumental in the passage of the document; and on 4 January, attended by a body of armed men, went down in person to the House of Commons and invaded the House in an attempt to arrest five of its members. Consult Gardiner's 'Constitutional Documents' (Oxford 1889).

GRAND RIVER, tributary of the Colorado River, which has its rise in the northwestern part of the State of Colorado, in the Rocky Mountains, and flows south by west into the State of Utah to lat. 40° 39', and then almost directly south to 35° 40', where it unites with the Green River (q.v.) to form the Colorado. Its length is almost 400 miles. Its chief tributaries are the Dolores and Gunnison. There are many deep canyons along its course through the mountains, and although much of the valley land is fertile, but few settlements have as yet been made.

GRAND RIVER, in Labrador, is the largest river in this section of British America which flows into the Atlantic Ocean. It rises in the Labrador Highlands, in Ashwanipi Lake. Its course, which is southward, is about 350 miles in length, flowing partly through a mountainous region and through a chain of lakes, and finding its outlet in Hamilton Inlet. The Canadian Geological Survey of 1894 gives the first reliable descriptions of this river and the adjacent country. See GRAND FALLS.

GRAND RIVER, Mich., has its rise in Jackson County, flows north and west in an irregular course for about one-half its distance, then west by north to Lake Michigan. Its whole length is nearly 300 miles, although a direct line from its source to its mouth is only about 100 miles. It is navigable from Grand Haven, at its mouth, to Grand Rapids, a distance of 40 miles. Above Grand Rapids there is a fall of 18 feet in one mile, which yields excellent water power.

GRAND RIVER, Mo., formed by the confluence of its Middle, East and West forks in Gentry County. It flows southeast through several counties, a distance of about 300 miles, into the Missouri River at Brunswick, Mo.

GRAND TRAVERSE BAY, an extension of Lake Michigan projecting into the State of Michigan, and named from Grand Traverse County, by which it is bounded on the south. The southern part of the bay is divided into two arms by Preogenise Point, the western arm being bounded by Leelenau County and the eastern arm by Antrim County.

GRAND TRIANON. See TRIANON.

GRAND TRUNK PACIFIC RAILWAY COMPANY. This Canadian company was incorporated by act of the Dominion Parliament, 24 Oct. 1903, for the purpose of constructing a railroad from Moncton, in the province of New Brunswick, to some suitable port on the Pacific Coast, in the northern portion of British Columbia. It is the joint enterprise of the Canadian government and the Grand Trunk Railway. The route of the line from Moncton to Quebec runs near the northern extremity of the State of Maine; from Quebec the line runs in a westerly direction to a point on the boundary line between the provinces of Ontario and Quebec, south of and near Lake Abittibi, thence in a westerly and northwesterly direction passing to the north of Lake Nipigon, to a point in the city of Winnipeg, thence westerly passing Edmonton, and on through the Rocky Mountains to Prince Rupert on the Pacific Coast.

By an agreement entered into with the Canadian government, the latter undertook to build the section from Moncton, N. B., to Winnipeg, Manitoba, and lease it to the Grand Trunk Pacific Company for a period of 50 years at rental of 3 per cent on cost of construction. For the first seven years the company was to be subject to payment of working expenses only (the government waiving the rental). For the remainder of the period, the company pays rental at the rate of 3 per cent on the cost of construction, except that in the event the company fails to earn the rental due for the first three years, following the period of seven years during which the company pays no rental (the 8th, 9th and 10th years of the lease), then the rental so unpaid shall be added to the capital account and interest paid thereon at the same rate — 3 per cent.

On the section Winnipeg to the Pacific Coast the Canadian government guaranteed for 50 years the payment of 75 per cent of the principal and interest of an issue of bonds not exceeding $13,000 a mile for the prairie portion (Winnipeg to the foot-hills of the Rocky Mountains, a distance of about 1,200 miles) and guaranteed for three-fourths of the cost of the section through the Rocky Mountains. The remaining 25 per cent is guaranteed by the Grand Trunk Railway Company of Canada. The Grand Trunk Pacific Railway is to provide the equipment for the entire line. The capital stock of the company is fixed at $45,000,000, of which $20,000,000 is preferred stock. The $25,000,000 of common stock is held by the Grand Trunk Railway Company of Canada.

The railways — although located in a more northerly latitude than any of the existing transcontinental lines — passes through a territory in a lower altitude, considerably lessening the cost of operation. The line crosses the extensive region of the Canadian northwest, which is enormously rich in agricultural and mineral products, at or about latitude 55°. The distances are as follows: Moncton to Winnipeg, 1,994 miles; Winnipeg to Prince Rupert, 1,746 miles.

Receipts on the Grand Trunk Pacific for year ended 30 June 1916 were: Passengers, $1,029,580; freight, $4,959,573; operating expenses, $5,902,843.

Construction, however, proved very expensive, the endeavor to establish low grades which would permit maximum train loads to be hauled causing greater expense to be incurred than in the construction of either the Canadian Pacific or the Canadian Northern. The line was completed 7 April 1914, at a point 375 miles east of Prince Rupert, and through sleeping car and freight service began 2 Sept. 1914. Owing to the inability of the company to operate the line with any hope of financial success, the eastern section, from Winnipeg to Moncton, a distance of 1,994 miles, was turned over to the Canadian government in 1915, and is now operated as part of the government railways. (See NATIONAL TRANSCONTINENTAL RAILWAY). In 1916 the Grand Trunk Pacific Railway Company requested the government to take over the line from Winnipeg to Prince Rupert, but this proposal was declined. An offer by the government to "advance by way of loan sufficient money to supply any deficiency in the amount required to meet the fixed charges of the Grand Trunk Pacific for a period of (say) five years," was met by a declination on the part of the company to accumulate further liabilities.

GRAND TRUNK RAILWAY SYSTEM OF CANADA. An international system of railways extending from Portland, Me., to Chicago, Ill., traversing the States of Maine, New Hampshire and Vermont, the provinces of Quebec and Ontario in Canada and the States of Michigan, Indiana and Illinois. The system (including leased and controlled lines) now comprises 5,382 miles of railway, of which about 1,000 miles of the main lines are double-tracked, including practically the entire distance between Saint Johns, Quebec, and Chicago, Ill., and (from Hamilton) to Niagara Falls. The Grand Trunk Railway Company was incorporated 10 Nov. 1852, by act of Parliament of the Dominion of Canada for the purpose of acquiring and operating as a unit various sections of railway then built, or in course of construction. The section between Portland, Me., and Montreal, Quebec, was opened in 1853, and the section Montreal, Quebec, to Sarnia, Ontario, via Toronto and Stratford, and the branch from Richmond, Quebec, to Point Levi, Quebec, the same year. In 1863 the line from Port Huron, Mich., to Detroit, Mich., was completed, thus providing a through route between Detroit, Mich., and Portland, Me. In 1880 the line from Port Huron, Mich., to Chicago, Ill., was completed and opened for traffic.

In 1882 the Grand Trunk acquired control of the Great Western Railway of Canada, extending from Suspension Bridge, N. Y., to Windsor, Ontario, with several branches north and south of the main line, and also the Detroit, Grand Haven and Milwaukee Railway, whose line extended from Detroit, Mich., to Grand Haven, Mich. In 1883 the Midland Railway of Canada was acquired, which included the branches north of the Grand Trunk Railway main line, extending from Belleville to Peterboro, Haliburton and Midland, in Ontario.

In 1888 an amalgamation was effected with the Northern and North Western System of railways extending from Port Dover and Hamilton to Collingwood, Meaford and Nipissing Junction, thus completing a network of railways under one management, reaching every town and village of importance in the southern peninsula of Ontario, and forming the consolidation of lines now known under the title of the Grand Trunk Railway System.

The Central Vermont Railroad and its leased lines, aggregating a total of 536 miles, is also controlled and operated in the interests of the Grand Trunk Railway System.

The Canada Atlantic Railway, extending from Swanton, Vt., to Ottawa, Ontario, the capital of the Dominion, and Parry Sound, on Georgian Bay, came under the control of the Grand Trunk Railway in 1905, and in 1914 it was merged in the system. The Canada Atlantic Transit Company, operating a line of steamers from Parry Sound to Fort William, Duluth, Milwaukee and Chicago is under the control of the Grand Trunk. A car ferry system is also operated between Windsor and Detroit, Milwaukee and Grand Haven and Coburg, Ontario, and Charlotte, the port of Rochester.

SUMMARY OF MILEAGE.

Lines Owned in Full.	Miles
Grand Trunk Railway	3,410
Leased and Controlled.	
Atlantic and Saint Lawrence Railway	165
Buffalo and Lake Huron Railway	161
Champlain and Saint Lawrence	1
Chicago, Delaware and Canada Grand Trunk Junction Railway	60
Michigan Air Line Railway	106
Owen Sound Branch	12
United States and Canada Railway	22
Leased.	
Cincinnati, Saginaw and Mackinaw Railway	53
Lewiston and Auburn Branch	6
Norway Branch	1
Operated under trackage rights	14
Total operated as Grand Trunk Railway of Canada	4,011
Controlled Lines.	Miles
Central Vermont Railway	536
Detroit and Toledo Shore Line Railway	81
Detroit, Grand Haven and Milwaukee Railway	191
Grand Trunk Western Railway	347
Pontiac, Oxford and N. Railway	101
Toledo, Saginaw and Muskegon Railway	116
	1,382

At Portland, Me., the Grand Trunk Railway owns extensive wharf and elevator facilities, the capacity of the latter being 2,500,000 bushels. Seagoing vessels can dock at any stage of the tide, and trains can be run alongside at any hour of the day. At Montreal the elevator capacity owned by the company is 2,250,000 bushels, while at the various lake ports reached by the company, viz., Midland, Collingwood, Meaford, Goderich, Parry Sound and Point Edward, there are large transfer and storage elevators with a combined capacity of about 5,000,000 bushels.

Several engineering works of considerable magnitude are numbered among the undertakings of the company, those particularly worthy of mention being: (1) The Victoria Tubular Bridge across the Saint Lawrence River at Montreal, one and a half miles in length, originally opened for traffic in 1860 by the late King Edward VII, then Prince of Wales. This bridge cost $7,000,000. In 1897–98 it was entirely rebuilt at a cost of $2,000,000, and is now a modern open truss double-track structure, having carriageways and footwalks on each side, and is known as the Victoria Jubilee Bridge. (2) The Niagara Falls double-track steel arch bridge spanning the gorge, completed in 1897, and replacing the old original Suspension Bridge, which was for over 40 years a landmark to travelers and tourists. This is the largest single-arch railway and vehicle bridge in the world, having a clear span of 555 feet. (3) The International Bridge between Fort Erie, Ontario, and Black Rock, N. Y., a distance of over a mile, which formerly consisted of iron single-track trusses across the main river and harbor at Black Rock, opened for traffic in 1873. This bridge was entirely reconstructed in 1901, and is now capable of carrying the heaviest loads. (4) The Saint Clair Tunnel, under the Saint Clair River from Sarnia, Ontario, to Port Huron, Mich., a distance of two and a quarter miles, commenced November 1888; finished August 1890. The length of the actual tunnel under the river is 6,026 feet; interior diameter, 20 feet.

For the year ending 30 June 1915, the gross earnings of the Grand Trunk Railway proper were $36,456,217, of which the freight receipts were $23,714,813, and passenger receipts $12,199,082. The operating expenses were $27,634,801, leaving a net revenue of $8,822,136. The equipment includes 1,044 locomotives, 1,069 passenger cars and 39,064 freight cars.

GRAND WASH CLIFFS. In the Colorado Plateau in Arizona, the rocks are for the most part nearly horizontal. They are cut, however, by several very large faults with a general north-south trend along most of which the west side has dropped many feet with respect to the east. The faults are comparatively recent and erosion has, therefore, not yet planed away the scraps; so that they show long lines of cliffs facing west. The most noted of these faults are the Hurricane cliffs and the Grand Wash cliffs.

GRANDFATHER CLAUSE, a clause in the constitutions of some Southern States which provides that the law of disfranchisement by means of an educational qualification shall not apply to white illiterate voters whose fathers or grandfathers had been voters before 1867. A great majority of negro voters are disfranchised by means of the educational qualification, but the grandfather clause applies only to whites.

GRANDISSIMES, The, by George W. Cable. No one has approached George W. Cable in portraying and interpreting the charm of picturesque New Orleans. After scoring a brilliant success in his first volume of short stories, 'Old Creole Days,' he undertook the more ambitious task of writing the novel, 'The Grandissimes.' The setting is the old Spanish-and-French city that centered about the Rue Royale — «a long, narrowing perspective of arcades, lattices, balconies, dormer windows, low, tiled roofs, red and wrinkled, huddled down into their own shadows. . . . The human life which dotted the view displayed a variety of tints and costumes such as a painter would be glad to take just as he found them.» If the scene of action shifts, it is to some historic building like the Cabillo, or the cathedral, or a stately mansion situated on the outlying bayous that then infested the suburbs.

The historic setting is that of the early years of the 19th century when the Americans had come into possession of the city and State. Agricola Fusilier, the representative of the proud families of the old régime, struggles somewhat tragically against the new order represented by the Americans and others with more modern ideas. Honoré Grandissime, the more progressive member of the Grandissime family, had been educated in Paris, where he had caught something of the revolutionary ideas that were remaking modern life. He makes the inexcusable mistake of «going over to the enemy,» which phrase meant, in the language of the reactionaries, «affiliation with Americans in matters of business and of government, the exchange of social amenities with a race of upstarts.» It implied a craven consent «to submit the sacredest prejudices of our fathers to the newfangled measuring-rods of pert and imported theories upon moral and political theories.»

There are many other types of characters, notably the descendants of the De Grapions, a charming mother and her daughter, of the Creole type without the social prejudices of their clan and in a sense the victims of the social ideas that had prevailed. There are all sorts of negro types: Bras-Coupé, a former African king and now a slave; Clemence, the pedler, who goes through the streets singing the African folk-songs with a sort of weird incantation; and the two mulattoes, Palmyre and «the free man of color,» who bears the same name as his white counterpart, Honoré Grandissime. These last two characters have naught in common with the members of the race to whom they are linked by reason of the slightest tincture of negro blood, and yet they are shut out from all the privileges and possibilities of the white race. At the end they disappear mysteriously from New Orleans and go to France to end their tragic careers.

To these various types must be added one who is for a long time an outsider — Joseph Frowenfeld, a German immigrant with scientific training sufficient to make him the prosperous owner of a drugstore, and with sufficient knowledge of modern intellectual and social ideas to make him a disinterested critic of the existing order in his adopted city. In fact, he is a sort of chorus through whom the author expresses his own views. He is told by the representatives of the old régime that he must «fall in» with the ideas of the community in mind, in taste, in conversation. He does not do so, but gradually wins to himself all the more progressive types of the novel, and especially the love of the charming daughter of a distinguished Creole family.

Aside from the setting and characters, the interest of the novel centres in this interpretation of a vanished social order. There has been much controversy as to whether the author rightly and justly portrays the people of New Orleans, and still more as to his views of the negro problem. It seems as if, in his sense of the tragedy of the free people of color under the old order and the suggestion that the same injustice still prevails now that slavery has passed away, he becomes in the novel less of the pure artist that he was in his first volume and more of the propagandist that he was in a later book, 'The Silent South.' Whatever may be said of the justice of these criticisms, the novel remains one of the most ambitious attempts in American fiction and a very suggestive, if not convincing, contribution to the question of the relations of the races.

EDWIN MIMS.

GRANDLEDGE, Mich., city in Eaton County, on the Grand River and the Pere Marquette Railroad, 14 miles northwest of Lansing. The manufactures are flour, canned goods, sewer-pipe, conduits and tile, furniture and foundry products; and its trade is in its manufactured articles, and the products of the surrounding agricultural country. Coal and fire clay are found in the neighborhood. The city is popular as a summer resort. Pop. 2,893.

GRANDPRE, grän-prā', Canada, village in Kings County, in the province of Nova Scotia, on the Dominion Atlantic Railroad, 15 miles northwest of Windsor by rail. The Grandpré Dyke and Long Island lie between it and Minas Basin. Longfellow's poem, 'Evangeline,' has made famous this village and the country around. In 1755 the French settlers living here were driven from their homes by British soldiers. Pop. 400. (See NOVA SCOTIA). Consult Eaton, 'Acadian Legends and Lyrics' (1889); 'Acadian Ballads' (1905); Swan, H. K., 'Nature in Acadia' (London 1911).

GRANET, grá-nā', **François Marius,** French painter: b. Aix, in Provence, 1775; d. there, 21 Nov. 1849. After studying under Constantin and David, in 1802 he went to Rome, spending much of his life there. He gained an enviable reputation as a painter of architectural subjects, though no small number of his works are historical. He was appointed custodian of the paintings in the Louvre in 1826, and upon his death bequeathed his fortune to his native city for the erection and maintenance of a museum there. The most famous of his works are ‘Interieur de l'église des Capuchins à Rome’ (1819); ‘Englise souterraine d'Assise’ (1823); ‘Le Tasse visitè dans sa prison par Montaigne’; and ‘Prise d'habit au couvent de Saint-Claire à Rome.’

GRANGE. See Grangers.

GRANGEMOUTH, Scotland, police burgh, parish and seaport of southeast Stirlingshire, situated close to the Firth of Forth and at the entrance to the Forth and Clyde Canal, and about three miles northeast of Falkirk. Its large docks are owned by the Caledonian Railway Company, and it has a harbor and graving dock. The principal industries áre shipbuilding, saw milling and coal mining, while the manufacture of iron and steel, brick and tile is carried on to a considerable extent. The exports are mainly coal, iron and machinery; imports, dyestuffs, iron ore, margarine and pit props. Steamer services are maintained with London, Norway and Sweden, and the Baltic. Pop. of police burgh 10,219.

GRANGER, grān'jėr, **Francis,** American politician: b. Suffield, Conn., 1792; d. 1868. He was the son of Gideon Granger (q.v.). Graduated from Yale in 1811, he began the practice of law in 1814, was elected from Ontario County to the State legislature of New York in 1825, was re-elected in 1826 and was a delegate to the Harrisburg (Pa.) Protectionist convention. He was prominent in the anti-Masonic movement of the time. In 1834 he was a leading candidate of the newly organized Whigs for the nomination for governor, and in 1834 and 1838 was elected to Congress, and in 1841 became Postmaster-General in President Harrison's Cabinet. He sat again in Congress in 1841–42, led the stampede of the Whig convention at Syracuse in 1850, and in 1861 was a member of the Peace convention held at Washington.

GRANGER, Gideon, American politician: b. Suffield, Conn., 19 July 1767; d. 31 Dec. 1822. He was graduated at Yale College in 1787, and having been admitted to the bar, rose to eminence in his profession, and was elected a member of the legislature of his native State. He had an active part in establishing the Connecticut school fund, and in 1801 President Jefferson appointed him Postmaster-General. He retained office during both of Jefferson's terms, and was reappointed by President Madison, whose policy he nevertheless opposed. He was consequently displaced in 1814, soon after Madison's second inauguration. He then removed to Canandaigua, N. Y., and was chosen a member of the senate of New York in 1819. He promoted internal improvements, and gave 1,000 acres to further the construction of the Erie Canal.

GRANGER, Gordon, American soldier: b. New York, 1821; d. Santa Fé, N. M., 10 Jan. 1876. He was graduated from the United States Military Academy in 1845, served with distinction in the Mexican War, during the Civil War was appointed, in 1862, to the command of the Army of Kentucky, with rank of major-general of volunteers, was prominent at Chickamauga, commanded a division at Fort Gaines (Ala.) (1864), and the 13th Army corps in the capture of Fort Morgan. Brevetted major-general for the capture of these forts, he was mustered out of the volunteers in 1866; in that year was promoted to be colonel, and afterward was commander of the district of New Mexico.

GRANGER, James, English writer and print collector: b. Shaston, Dorset, in 1723; d. Shiplake, Oxfordshire, 15 April 1776. He studied for a time at Christ Church, Oxford, took holy orders, and was assigned to the vicarage of Shiplake. After a long pastorate there he went on a tour through Holland, in 1773. He wrote ‘A Biographical History of England . . . with a preface showing the utility of a collection of engraved portraits, etc.’ (1769). By 1824 his works had received enough additions to make six volumes. In 1806 the Rev. Mark Noble edited another edition of his works, and since then several editions of his works, together with additions by other authors, have appeared. The putting in of blank leaves into a book for the insertion of portraits cut out of other works is called, after him, “Grangerizing.”

GRANGER, Robert Seaman, American soldier: b. Zanesville, Ohio, 24 May 1816; d. Washington, D. C., 25 April 1894. A graduate of the United States Military Academy (1838), he served in the Seminole, Mexican and Civil wars, and in the last named was brigadier-general of volunteers in 1862-65. During the Civil War he commanded the military district of northern Alabama, in 1864, in the same year defended Decatur against Hood, and in 1865, during the occupation commanded northern Alabama. In this latter year he was made major-general and later on lieutenant-colonel of the 11th Infantry. In 1871 he was promoted to the rank of full colonel.

GRANGER CASES (said by Justice Field during the trial to be the popular term outside for the whole group; but only as being in the farmers' interest, not because the Patrons of Husbandry, or any of its lodges as such, had anything to do with them), six cases decided in the United States Supreme Court, October term, 1876, all bearing on the same point and decided on the same principles. They were Munn v. Illinois; Chicago, Burlington and Quincy Railroad Company v. Iowa; Peik v. Chicago and Northwestern Railroad Company; Chicago, Milwaukee and Saint Paul Railroad Company v. Ackley; Winona and Saint Paul Railroad Company v. Blake; and Stone v. Wisconsin. The first, whose decision ruled the others and was given at much the greatest length, was to test whether the act of the Illinois legislature, 25 April 1871, to regulate public warehouses and the inspection and handling of grain, was constitutional. The case was an extreme one; the act was passed for warehouses only in “cities of over 100,000 people” (Chicago), and was therefore a special discrimination; it laid a host of minute, costly and laborious impositions on warehousemen and elevator owners, and obliged them to publish daily in the newspapers a table of the charges made the previous year, which must not be increased during the current year — therefore, of course, never, as each year was a canon for the next. The court decided that, according to immemorial common law, the government had a right to regulate the use of property for the public good, and to fix maximum charges for public services of those with whom the public has no choice but to deal. Such regulations were never supposed to deprive private owners of their property, but the devotion of property to a use in which the public has an interest subjects it *pro tanto* to public control. In other words, the public is a partner in public corporations. The forms of law may be changed at the will of the legislative body, so long as they only give new effect to old provisions. And warehouses exclusively within one State may be regulated by State legislation, even though their business involves interstate relations. Justice Field made a powerful dissenting argument, concurred in by Justice Strong, on the ground that the legislature had no right to meddle with private business, and it was simply giving that body the power to confiscate private property, contrary to the Constitution. The railroad cases were all against the power of the States under legislation to enforce maximum transportation rates. The decisions were the same in essence, but the court declined to pronounce that the roads would forfeit their charter if they disobeyed the law, which, nevertheless, was not repugnant to the Constitution. The division of the court was the same; and Justice Field again stated the case for the companies. It was, that the charters of the roads were constitutional, and the right to reasonable compensation was the essential feature of the grant; that what was reasonable was a question for the judges and not the legislature to determine. Such regulation of fares as would take from a company the power to meet its just obligations was illegal, and only the courts could determine the facts; this, therefore, was taking away private property without process of law. Such an interpretation of the limits of legislative power over corporations places them at the mercy of every legislative majority. It makes all business public business, and practically destroys all the guaranties of the Constitution. Consult Hare, ‹American Constitutional Law› (Boston 1889).

GRANGERS (O. Fr. *graunge*, Med. Latin *granea*, a place to store grain, *granum*), the popular name for the Patrons of Husbandry, a secret association in the interests of agriculture. In 1866 the government sent O. H. Kelley (on the staff of the Department of Agriculture) to inspect and report on agricultural conditions in the South, and suggest means of improving them; he found them very wretched, and the farmers poor, backward and disintegrated. Considering organization the first requisite for self-defense, and for securing improved methods and needed legislation, he, with six others, formed in December 1867 the National Grange (Farm) of Patrons of Industry. Only farmers could be members; but their women were admitted both to membership and office. The machinery was like that of other secret societies; the local bodies were called granges, and each State had its State grange. There were four «degrees» in local granges, one in State («Pomona,») and two in national («Flora» and «Ceres»). For the first four years the growth was slow; in 1872 it began to spread rapidly, in a year it had over 10,000 granges, and in 1875 its membership was 1,500,000, distributed through every State in the Union. By its rules the order was to have no part in political work, nominations, or discussions, and as an order it had none, but the members could not be expected to neglect the very object of its existence, and almost immediately they began work against railroad rates and discriminations, trusts, «futures,» oleomargarine, etc., besides forming the chief part of the great movement against hard money (see GREENBACK PARTY) — in all of which their organization, and the consequent bid for their support from political parties, aided them enormously. It is therefore not surprising that «granger» has become a typical adjective for all measures in the supposed interest of the Western and Southern farmers, or of which they form the chief support, the word having the sanction of the highest court (see GRANGER CASES). The Department of Agriculture as a Cabinet office, the act for founding experiment stations and the Interstate Commerce Bureau are among the more legitimate fruits of the order; others are the subject of much difference of opinion. It has also done much to form co-operative societies, and attempted to make the grain-elevator system a portion of it. The political element, however, was discrediting the whole movement by its excesses and ill judgment, and finally took separate shape as the Farmers' Alliance and the Populist Party (qq.v.), leaving the diminished Patrons of Husbandry to a useful and growing social and industrial influence. The farmers' movement had a membership of about 800,000 in 1874; but this had almost doubled itself in the following year, due to the reorganization of the preceding year. The National Farmers' Alliance and Industrial Union organized in 1889 was largely confined to the South where it gained considerable strength. The National Farmers' Convention held in Saint Louis in 1890 claimed to represent a membership of over 5,000,000 farmers. In 1892 a large part of the grange organization strength went to swell the Populist party, which, in the presidential election of that year, cast 1,041,021 votes.

GRANITE, an unstratified rock, normally consisting of three simple minerals, feldspar, quartz and mica, or, in Dana's nomenclature, of orthoclase, quartz and mica. Granite, in which the mica is the variety biotite, is called biotite granite; if musconite, it is named musconite granite; if much hornblende is present, it is called hornblende granite. It is an «igneous» rock of «plutonic» type, having originated beneath the surface under high pressure. Like surface volcanic rocks it has been fused and afterward cooled; but it does not, like them, comprehend tuffs and breccias, etc., but assumes a crystalline texture, destitute of pores, or cellular cavities to which gases entangled in lava or any such rock give rise. Its coarse crystallinity is due largely to the fact that it has cooled very slowly deep within the earth, giving plenty of time for complete crystals to form. A proof of its igneous origin is that it has in many places broken through ordinary sedimentary or metamorphic strata, sending dikes (q.v.) through them in various directions. It rarely, however, overtops or caps them, as if coming up molten through a crater it had overflowed them above. It is of all ages, some granite in the Alps having broken up through the strata during Tertiary times, while large bodies of it are known of Precambrian Age. Granite is of much economic value as a building stone. The production of granite in the United States in 1914 was valued at $20,028,919. The leading States in its production were Maine, Massachusetts, Vermont and Delaware. See GEOLOGY; ROCKS.

GRANITE CITY, Ill., city in Madison County, near the Mississippi, opposite Saint Louis, Mo., on the Cleveland, Cincinnati, Chicago and Saint Louis, the Wabash and several other railroads. It contains a public hospital and has iron and steel works, tinplate works, granite-ware manufactories, bridge works, a sheet-lead mill and a refinery for corn-products. In 1914 there were 39 establishments in operation with an aggregate capital of $18,867,000, and giving employment to 5,658 persons. The salaries and wages paid amounted to $4,866,000. The materials used were valued at $9,845,000 and the value of the products was placed at $17,903,000. It was settled in 1892 and the government is vested in a mayor and council chosen for two years. Pop. 15,142.

GRANITE STATE, The, the popular name of New Hampshire. Fine building granite is quarried at many points, notably at Plymouth, Concord, Milford, Pelham, etc.

GRANOVSKII, grăn-ŏf'skē-ē, **Timofei Nikolaevich,** Russian educator: b. 9 March 1813; d. 4 Oct. 1855. He received his elementary education at home where he studied French and English and spent his leisure in reading novels and works of travel and history. At the age of 18 he entered into a close friendship with his sisters' French governess, who exercised a powerful influence over him and aroused in him a wild desire for literature. In 1834 he was attached to the Ministry for Foreign Affairs, but four years later he was appointed secretary in the geographic department of the Admiralty. A few years later he was sent abroad (Berlin, Dresden, Prague) to specialize in history. Of all the historians his favorites were Leopold von Ranke, Ritter and Verder. In 1839 he went to Moscow and started a series of most interesting lectures on philology and law. His unusual eloquence combined with his natural poetic warmth won his students' sympathy to such an extent that he was soon recognized as one of the best improvising lecturers in the empire. Besides his courses at the university he gave a number of public lectures which increased still more his popularity, for he knew how to draw a synthesis of events which are described on various pages of history and of which he made always one picture that possessed a distinct character. He was not very fond of writing but his monographs ‘Contemporary Condition and Importance of General History,’ ‘Patrimonial Existence of the Old Germans,’ ‘About the Fates of Italy,’ etc., display a conscientious historian's activities: he banishes the idea of unilateral appreciations and optional conclusions, but points to the possibility of co-operation of natural science with history and endeavors to determine if history is entitled to an individual method, and, if so, to what extent.

GRANT, SIR **Alexander,** English educator: b. New York, 13 Sept. 1826; d. Edinburgh, 30 Nov. 1884. He went to India in 1859, and in 1862 became principal of the Elphinstone College, Madras, and in 1863 was made vice-chancellor of Bombay University. In 1868 he returned to Scotland to become principal of the University of Edinburgh, a position which he held till his death. He wrote ‘Story of the University of Edinburgh’ (1883).

GRANT, Frederick Dent, American soldier: b. Saint Louis, Mo., 30 May 1850; d. New York, 11 April 1912. He was the eldest son of Gen. Ulysses S. Grant (q.v.), whom he accompanied during several battles of the Civil War, being wounded at Vicksburg, and was graduated from the United States Military Academy in 1871, was assigned to the 4th Cavalry, was aide-de-camp to Sheridan in the latter's Indian campaigns, in 1874 served in the Black Hills expedition, and in 1881 resigned from the army with rank of colonel. He was Minister to Austria in 1888–93, and a police commissioner of New York in 1894–97. At the outbreak of the Spanish-American War (1898) he became colonel of the 144th New York Volunteers, was in the same year appointed brigadier-general of volunteers, served for a year in Porto Rico, and subsequently commanded the military district of San Juan. He was also stationed in the Philippines, and appointed brigadier-general in the regular service in 1901. He became major-general 6 Feb. 1906, commanded the departments of Texas 1902–04, of the Lakes 1904, of the East 1904–08, and from 1908 of the Lakes.

GRANT, George Monro, Canadian educationist: b. Albion Mines, Nova Scotia, 23 Dec. 1835; d. Kingston, Ontario, 10 May 1902. He graduated at the University of Glasgow, was ordained to the Presbyterian ministry in Nova Scotia in 1860, and was minister of Saint Matthew's Church, Halifax, 1863–77. In 1872 he accompanied Sandford Fleming in his overland journey to the Pacific, of which he has left a graphic account in ‘Ocean to Ocean’ (1873). In 1877 he was appointed principal of Queen's University (q.v.), Kingston, Ontario, which he found in a languishing and almost moribund condition, but which he raised to a high position among the universities of the American continent. His literary works include ‘Advantages of Imperial Federation’ (1889); ‘Our National Objects and Aims’ (1890); ‘Religions of the World in Relation to Christianity’ (1894).

GRANT, Robert, American author and judge: b. Boston, Mass., 24 Jan. 1852. He was graduated from Harvard in 1873 and the Harvard Law School in 1879, and has practised law in his native city since 1879. He was one of the water commissioners of Boston 1888–93, and in the latter year became a judge of probate and insolvency for Suffolk County, Mass. He is overseer of Harvard College since 1895, and is a member of the American Academy of Arts and Letters and the Massachusetts Historical Society. He has published ‘The Little Tin Gods on Wheels’ (1879); ‘Confessions of a Frivolous Girl’ (1880); ‘The Lambs,’ verse (1882); ‘An Average Man’ (1883); ‘Face to Face’ (1886); ‘Jack Hall’ (1887); ‘Jack in the Bush’ (1888); The Reflections of a Married Man’ (1892); ‘The Opinions of a Philosopher’ (1893); ‘The Art of Living’ (1895); ‘The Bachelor's Christmas’ (1895); ‘Search Light

Letters' (1899); 'Unleavened Bread,' a novel which has been widely read (1900); 'The Undercurrent' (1901); 'The Orchid' (1905); 'The Law Breakers' (1906); 'The Chippendales' (1909); 'The Convictions of a Grandfather' (1912); 'The High Priestess' (1915).

GRANT, (Hiram) Ulysses Simpson, American general and 18th President of the United States: b. Point Pleasant, Clermont County, Ohio, 27 April 1822; d. Mount McGregor, N. Y., 23 July 1885. He was the eldest of the six children of Jesse R. Grant and Hannah Simpson Grant and on the paternal side is supposed to have been of remote Scottish descent. In 1823, a year after the birth of Ulysses, the family moved to Georgetown, Ohio, where Ulysses was brought up, working on his father's farm in summer and attending school in the winter. He detested the tanning trade, in which business his father was engaged, but was fond of agriculture and loved horses, becoming a remarkably proficient rider and teamster at an early age. After an elementary education in John D. White's subscription school at Georgetown, he was sent to Maysville Seminary, Maysville, Ky., which he attended in 1836–37, and in 1838–39 was provided with a winter term at an academy at Ripley, near Georgetown. In 1839 his father obtained for him an appointment to the Military Academy at West Point, but in making the application for Grant, Congressman Hamer erroneously called him «Ulysses Simpson Grant» instead of Hiram Ulysses, and thus his name appeared on the muster-roll. The young man was not displeased by the change and after a few years himself discarded the Hiram, which he had always disliked.

Grant's record at West Point was excellent in mathematics and engineering and fair in other studies but he surpassed all in horsemanship; he graduated in 1843, 21st in a class of 39, was commissioned brevet second lieutenant, assigned to the Fourth United States Infantry, and sent to Jefferson Barracks, near Saint Louis, Mo. In May 1844 his regiment was ordered to the southwestern frontier and in September 1845 to Texas as a part of the army under Zachary Taylor. On 30 Sept. 1845 he was promoted to full second lieutenant; in May 1846 took part in the battles of Palo Alto and Resaca de la Palma (qq.v.); in August, at Camargo, was appointed regimental quartermaster and commissary; in September was present at the battle of Monterey (q.v.), where he performed a daring ride under fire to obtain new supplies for the troops on the firing line; and in December was sent with his regiment to the mouth of the Rio Grande. He participated in all the battles of General Scott's march to Mexico City — Vera Cruz, Cerro Gordo, Contreras, Churubusco, Molino del Rey and Chapultepec (qq.v.), being made first lieutenant for bravery at Molino del Rey and brevetted captain at Chapultepec. His regiment was at Mexico City until June 1848, when it was ordered to Mississippi, but Grant obtained leave of absence and returned home to be married (22 August) to Miss Julia T. Dent. In July 1852 after four years of garrison duty at Detroit and Sackett's Harbor, the regiment was transferred by way of Panama to Fort Vancouver on the Columbia River; while there he endeavored to increase his income by farming, cattle-raising and other enterprises, but invariably failed to improve his fortunes. On 5 Aug. 1853 he was promoted to a captaincy and ordered to Fort Humboldt, Cal., where he served until April 1854, but becoming disheartened by the never-ending vista of barrack life and far removed from the wholesome influence of wife and family, he fell into evil ways, began to drink and finally, was directed to resign or stand trial on charges. Accordingly he resigned from the service 11 April 1854 to take effect 31 July, and returned to Saint Louis.

Frederick Dent, who lived near Saint Louis, had given his daughter (Grant's wife) 80 acres of land, and on Grant's return loaned him $1,000 with which to engage in farming. On this property Grant built a log cabin, which he called «Hard Scrabble,» and lived there until 1858, clearing the land, hauling wood, plowing, hoeing and enduring all the hardships and privations of a small farmer. In 1858, however, he abandoned farming because of illness and returned to Saint Louis, where, during the next two years, owing to his inaptitude for ordinary business life and carelessness in money matters, he earned only a scanty subsistence in the real estate business. In 1860 he removed to Galena, Ill., where his father had established a leather store (a branch of his tanning business at Covington, Ky.), and there he worked at an annual salary of $800 until the outbreak of the Civil War.

When a war meeting was held to secure enlistments Captain Grant was made chairman of the meeting but declined an offer of the captaincy of the company enlisted, saying «I have been a captain in the regular army. I am fitted to command a regiment.» On 25 April, however, he accompanied the troops to Springfield, where on 8 May he was attached to the adjutant-general's office as mustering officer, mustering in several regiments, among which was the 7th District Regiment (later the 21st Illinois). On 24 May 1861 he tendered his services to the War Department at Washington, suggesting that he was competent to command a regiment, but received no reply and had almost abandoned hope of making any headway in the military service when (17 June) he was appointed colonel of the above regiment, though compelled to borrow money to purchase the proper officer's outfit. He served with his regiment under Pope in Missouri (endeavoring to suppress guerilla warfare), until 7 August, when he was appointed by Lincoln brigadier-general of volunteers, on 4 September assuming command of the district of southeastern Missouri and western Kentucky, with headquarters at Cairo. Immediately on his arrival he seized Paducah, Ky., a town of great strategic importance at the junction of the Tennessee and the Ohio rivers, on 25 September occupied Smithland, and then spent several weeks in organization and drill, in fortifying important locations and in reconnaissances against the enemy. On 7 November he attacked and captured the Confederate camp at Belmont, Mo., but the arrival of Confederate reinforcements compelled him to retire to his transports.

In February 1862, after much persuasion, Gen. H. W. Halleck allowed Grant to proceed against Fort Henry on the east bank of the Tennessee. Accordingly, with 15,000 troops, and accompanied by the gunboat flotilla under

A. H. Foote, Grant set out, and on the 6th, after a terrific bombardment by the gunboats, compelled the fort to surrender. He then invested Fort Donelson, on the west bank of the Cumberland River, 12 miles away. A Confederate sortie on the 15th failed to loosen Grant's grip and on the 16th Gen. S. B. Buckner proposed an armistice and the appointment of commissioners to settle terms of capitulation, but Grant replied: «No terms except unconditional and immediate surrender can be accepted. I propose to move immediately upon your works.» Buckner surrendered the fort and about 15,000 troops and Grant became famous as «Unconditional Surrender Grant.» This brilliant piece of work was the first important victory for the Union cause and its moral effect was tremendous. In spite of the jealousy of Halleck and his efforts to belittle and humiliate Grant, who afterward for a time was virtually under arrest, Lincoln nominated Grant as major-general of volunteers, to date from the surrender, and the Senate confirmed the appointment. See Fort Henry and Fort Donelson.

Grant's next important battle was at Shiloh (q.v.) or Pittsburg Landing. At that point were five divisions of Grant's army, while he himself was at Savannah, nine miles away, awaiting the arrival of an army under Don Carlos Buell. On 6 April the Confederate army, under Gen. A. S. Johnston, attacked the Union troops at the Landing and beat them back to the Tennessee River with great loss; but Grant, having been reinforced by Buell's army, reformed his lines, renewed the battle on the 7th and drove the Confederates, now under Beauregard, Johnston having been killed in action, back to Corinth, Miss. The highly colored reports of this battle in the newspapers of the North called forth the most violent and acrid denunciations of Grant, who was charged with neglecting his army through dissipation, with recklessly exposing his men and with being in the rear at a critical time; moreover the public was dismayed by the large loss of life, this being the bloodiest battle up to that time in the history of the country. But Lincoln, unswayed by the widespread clamor for Grant's removal, resolutely rejected all such demands, saying «I can't spare this man, he fights.» On 11 April Halleck arrived at the Landing and in a spirit of petty jealousy took personal command of the army, much to Grant's chagrin, and the latter, though nominally second in command, was completely ignored in the following ludicrous campaign against Corinth (q.v.), which was occupied by the Union troops 30 May. Grant was so disgusted by what he deemed an unwarranted displacement that he contemplated leaving the army but was dissuaded by Sherman. On 11 July, however, Halleck was called to Washington and left Grant in charge of the district of West Tennessee, embracing the territory west of the Cumberland River, with headquarters at Corinth. On 19–20 September Grant forced Price to retreat at Iuka (q.v.), on 3–4 October a part of his army under Rosecrans signally defeated Price and Van Dorn at Corinth (q.v.) and on the 25th he was placed in command of the Department of the Tennessee, charged with the special duty of taking Vicksburg.

By November 1862 Grant was in sufficient force to undertake an offensive campaign. Sending Sherman to attack Vicksburg in front, Grant went to the interior to cut off escape by the rear. First came the reverse at Holly Springs (q.v.) 20 December and on the 29th the sanguinary battle of Chickasaw Bayou (q.v.) was fought, but on 10–11 Jan. 1863 Sherman managed to capture Arkansas Post or Fort Hindman (q.v.) and thus saved from utter failure a campaign that had been planned on an unsound basis and subjected to considerable interference by a series of political intrigues. Nevertheless Grant possessed the energy and perisistency necessary to accomplish the task before him; the plan of campaign was changed several times without appreciable result, but finally, after months of seemingly hopeless work, by a series of brilliant manœuvres, a regular siege of Vicksburg was instituted in May and on 4 July 1863 the fortress and town were surrendered with over 30,000 troops, the largest body of soldiers that had been captured on this continent up to that time. (See Yazoo Pass and Steele's Bayou; Port Gibson; Raymond; Jackson; Champion's Hill; Big Black; Milliken's Bend; Vicksburg; Port Hudson). Grant was now the «man of destiny» and a national hero; on 16 July Lincoln wrote a personal letter of congratulation and nominated him as major-general in the regular army; and in October he was placed in command of the Military Division of the Mississippi.

The fall of Vicksburg severed the Confederacy and in October, as little opposition was expected in that quarter, Grant proceeded to Chattanooga where Rosecrans, after the Tullahoma campaign (q.v.), and the disastrous battle of Chickamauga (q.v.) 19–20 Sept. 1863, was beleaguered by the Confederates under Bragg, while shortly afterward Burnside was besieged by Longstreet at Knoxville. By a series of swift and dramatic battles, 23–25 November, Grant captured Lookout Mountain and Missionary Ridge (see Chattanooga) and completely routed Bragg (see Ringgold Gap), then sending Sherman to Burnside's relief at Knoxville (see Cumberland Gap; Rogersville; Campbell's Station; Knoxville). This victory opened the way for Sherman's Meridian expedition (q.v.), his capture of Atlanta and his subsequent «March to the Sea.» At its next session Congress not only passed a vote of thanks to Grant and his army and ordered a gold medal to be struck in his honor, but also on 29 Feb. 1864 revived the grade of lieutenant-general and on 2 March confirmed Lincoln's nomination of Grant to that position. A few days later Grant proceeded to Washington and assumed command of the armies of the United States, making his headquarters with the Army of the Potomac and immediately formulating plans to defeat the army under Gen. R. E. Lee and capture Richmond.

Grant's first movements, though unsuccessful in their main design, resulted in crippling the enemy but only at disheartening sacrifices of troops. He pursued a merciless policy of attrition and proposed to exhaust Lee's army, even though his gains were not commensurate with the unprecedented cost of these operations. In spite of repeated partial reverses and tremendous losses in killed and wounded, he never relaxed his hold on Lee's army, but slowly and

ULYSSES SIMPSON GRANT

Eighteenth President of the United States

inexorably drove it back upon Petersburg and Richmond. Grant sent Sherman against Johnston who was protecting Atlanta and ordered B. F. Butler with the Army of the James to threaten Richmond from the southeast, while he himself, with the Army of the Potomac under Gen. G. G. Meade, attacked Lee. On 4 May 1864, with an army approximately twice the size of Lee's, Grant crossed the Rapidan, and on 5–6 May fought the bloody battle of the Wilderness (q.v.), suffering far greater loss than he inflicted (see also Todd's Tavern). Sheridan was then sent with the cavalry on a raiding expedition toward Richmond (q.v.; see also Po River); and on 10–12 May, Grant engaged in the hardest and closest fighting of the war in the series of battles including the «Bloody Angle» at Spottsylvania Court House (q.v.). In spite of Hancock's success at the «Angle,» Grant failed in his main purpose to break through Lee's centre, roll up his flanks and thus destroy the fighting morale of his army. But Grant had said: «I propose to fight it out on this line if it takes all summer,» and accordingly continued to hammer at Lee, though for some time the latter managed to fight the Union army to a standstill and to frustrate every effort to draw him from his almost impregnable position (see North Anna; Hawes' Shop; Pamunkey and Totopotomoy). By this time also Gen. Franz Sigel had been defeated at New Market (q.v.) and Butler had been bottled up at Bermuda Hundred (see Drewry's Bluff; Swift Creek), wherefore Lee was safe from attack on that quarter and the Shenandoah Valley was open. On 3 June Grant tried to break through Lee's lines at Cold Harbor (q.v.) but the enormous loss of life in this unsuccessful assault convinced him that flanking movements were futile and too costly and that his only hope of capturing Richmond lay in taking Petersburg. Gen. J. H. Wilson led two cavalry divisions around Petersburg, destroying large sections of the Weldon and Southside railroads (q.v.) and Sheridan made a raid toward Trevilian (q.v.), but the midsummer heat prevented extended offensive operations (see Jerusalem Plank Road; Deep Bottom; Saint Mary's Church). On 30 July occurred the explosion of the Petersburg mine and the disastrous and abortive assault of the Confederate works. During the next few weary months attention was centred on the operations in the Shenandoah Valley (q.v.) where Jubal A. Early came in contact with Sheridan and finally on 19 Oct. 1864 was defeated by him at Cedar Creek (q.v.); on Sherman's campaign against Hood, resulting in the capture of Atlanta on 2 September and of Savannah on 22 December (see March to the Sea); on Schofield's failure at Franklin (q.v.) 30 November, and on Thomas' overwhelming defeat of Hood at Nashville (q.v.) 15–16 December.

During this time Grant was constantly tightening his hold on Lee's lines (see Petersburg; Deep Bottom; Globe Tavern; Ream's Station; Fort Harrison; Poplar Spring Church; Hatcher's Run (Boydton Road); Fair Oaks and Darbytown Road) and waiting for Sherman and Sheridan to cut off Lee's sources of supplies from the south and west, planning thereby to starve him out. On 25 Jan. 1865 Fort Fisher (q.v.) was captured. Sherman advanced from Savannah and pierced the Carolinas (see Savannah to Goldsboro; Kinston), and in March, after the battle of Hatcher's Run (Dabney's Mill and Armstrong's Mill, q.v.), Grant began his great offensive against the Petersburg lines, first repulsing a sortie by Lee at Fort Stedman (q.v.) 25 March. On 31 March and 1 April, Sheridan won victories at Dinwiddie Court House, White Oak Road and Five Forks (qq.v.), wherefore on the night of 2–3 April, Lee abandoned his untenable position at Petersburg and ordered his troops to concentrate at Amelia Court House, south of Appomattox. The next day (3 April) Richmond was evacuated and the Union forces occupied the city, Grant continuing to pursue the Confederates, then in a desperate plight because their supply trains had been sent to the wrong place. By the 8th Lee was almost surrounded (see Farmville and Highbridge; Sailor's Creek) and therefore on the 9th, realizing the utter hopelessness and futility of further resistance, he surrendered to Grant at Appomattox Court House. Grant afterward stated that he «felt like anything rather than rejoicing at the downfall of a foe who had fought so long and valiantly and had suffered so much for a cause,» and therefore his terms of surrender were very generous, winning for him the respect and admiration of the Southern people. Subsequently, when a question arose as to whether Lee could be prosecuted for treason, Grant promptly declared that the terms of surrender included Lee and if such a course were pursued he would resign his commission and appeal to the country. Grant returned to Washington amid the rejoicing of the entire nation, soon to be plunged into despair by Lincoln's assassination. On 23–24 May he reviewed the army parade at Washington and then visited many Northern cities, receiving innumerable gifts from admiring citizens and honorary degrees from Harvard University and other institutions.

Respecting the reconstruction, Grant at first favored President Johnson and at his request made a tour of inspection of North and South Carolina and Georgia in the fall of 1865, reporting that «the mass of thinking men of the South accept the present situation of affairs in good faith.» He also accompanied the President on his famous «swing around the circle» in 1866, though he took no active part in the President's propaganda in favor of his reconstruction policy. Having been commissioned General of the Armies of the United States (25 July 1866), Grant was now the foremost citizen of the republic and as he had become an available candidate for the Presidential nomination, the leaders of both political parties sought to secure his adherence, since it was probable that his popularity would influence a considerable independent vote. But President Johnson involved Grant in the struggle over reconstruction measures and by his course drove him into the radical ranks. In August 1867 Johnson suspended Secretary of War Stanton (q.v.) and appointed Grant Secretary *ad interim*, but on 13 Jan. 1868 the Senate disapproved of Stanton's suspension, whereupon Grant vacated the office. A dispute arose over Grant's actions in this connection, Johnson questioning his good faith, thus driving him into bitter opposition to Johnson and making him an advocate of impeachment. Hence, in May 1868 Grant was unanimously nominated for the Presidency by the Republican convention at Chicago, and though taking little part in the campaign, defeated his Democratic opponent (Gov. Horatio Seymour), receiving 214 of the 294 electoral votes.

Grant's inexperience in civil administration was conceded, his lack of political finesse was admitted and his reticence and taciturnity were pronounced, but his strong will was also known and his rugged patriotism had been proven. He caused much criticism in forming his Cabinet owing to the preponderance of millionaires and personal friends and by making his personal appointments in the President's household largely from the military staff. However, he possessed the confidence of the people and this was increased by the negotiation of the Treaty of Washington (q.v. See also ALABAMA CLAIMS; HAMILTON FISH; UNITED STATES — HISTORY OF ARBITRATIONS; UNITED STATES — DIPLOMACY), but his persistent efforts to annex Santo Domingo led to much ill feeling and also to a rupture of relations with Charles Sumner (q.v.). Grant was deeply interested in South and Central American affairs and desired to recognize the Cuban insurgents but was dissuaded from so doing by Secretary Fish; in the subsequent *Virginius* affair, however, popular indignation was so thoroughly aroused that Grant put the navy on a war footing and later Spain rendered adequate reparation. The most important domestic problem during his first term, aside from his peaceful Indian policy and civil service reform, was the reconstruction of the Southern States, but as the actual work of reorganization was almost finished, the President was inclined to leave the completion of the task to the newly formed State governments (see UNITED STATES —THE RECONSTRUCTION). Still there was a growing conviction that the administration was inefficient, that the civil service was neglected and abused and that in his appointments Grant was yielding too frequently to the importunities of politicians; accordingly in 1872 a great reform movement was inaugurated, the instigators of which called themselves Liberal Republicans. Grant was charged with nepotism because of his numerous appointments to public office of relatives of his own and of the Dent families and with being «notoriously loaded down with presents;» and the Gould-Fisk attempt to corner gold, culminating in Black Friday (q.v.), was attributed to a New York speculator who had married into the President's family. But in 1872, despite these and other irregularities, such as the Crédit Mobilier scandal (q.v.), ordinarily regarded as weaknesses in a candidate, Grant easily defeated his Democratic-Liberal-Republican opponent, Horace Greeley (q.v.), obtaining a plurality of over 700,000 and an electoral vote of 286. The new administration was almost immediately confronted with financial disaster and panic but the President rendered a great service to the country when he vetoed a bill passed by Congress for the inflation of the paper currency and urged the passage of the bill for resuming specie payments. The last years of his Presidency mark the lowest ebb ever reached in the political morale of the country. The «Salary Grab» (q.v.), the Whisky Ring Frauds (q.v.), the scandal in the Treasury Department regarding the Sanborn contracts, the Safe-Burglary frauds, the Seal-Lock frauds, the Subsidy frauds, the impeachment of Secretary of War Belknap (q.v.) and other malodorous affairs aroused universal indignation and protest, though the President personally was in no way implicated. Probably never was Grant so low in the popular estimation as in the summer and fall of 1876. As a result the Democratic candidate (Samuel J. Tilden) received a majority of the popular vote in 1876, but the Republican candidate was placed in office by the decision of the Electoral Commission (q.v. See also UNITED STATES—DISPUTED ELECTIONS). During this time numerous threats were made of an appeal to arms, but Grant's disposition of the army prevented disorder and his influence counted for peace and restraint.

At the close of his second term in 1877 Grant, with his wife and youngest son, Jesse, made a tour of the world; he returned in September 1879 and in the spring of 1880 an effort was made to secure for him a third nomination for the Presidency, but the sentiment against a third term could not be overcome. Shortly afterward he moved to New York city and, besides accepting the unsalaried presidency of the Mexican Southern Railway, became a special partner in the firm of Grant & Ward; his name and property were used in the business but he took no active part in the management. In 1884 this firm failed, ruining Grant and other members of his family, and an unsuccessful effort was made to hold him personally liable. To satisfy his creditors he surrendered all his property, including the unique collection of souvenirs, swords and other mementoes gathered during his tour, and this collection eventually became the property of the nation. Every token of respect was shown him and in March 1885, by special legislation, Congress restored him to the rank of General (since he had resigned to become President) and retired him on full pay. When the first storm of criticism had passed, Grant undertook to write his memoirs, hoping that the sale would furnish a competence for his wife, and then began the most heroic year of his life. Though suffering almost ceaseless pain, owing to a cancerous growth in his throat, he continued steadily at this work, dictating when he could and writing when speech was impossible, and ultimately produced a work that took rank as one of the great martial biographies of the world. In June 1885 he was moved to Mount McGregor, near Saratoga, N. Y., in the hope that the change would benefit him, but the march of the fatal disease could not be stayed and he died on 23 July. His body found its final resting place in the great mausoleum on Riverside Drive, New York city, overlooking the Hudson.

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GRANT UNIVERSITY, a coeducational institution in Chattanooga, Tenn., with departments in Athens, Tenn., founded in 1867, under the auspices of the Methodist Episcopal Church. The faculty consists of about 65 professors and instructors; the average annual attendance of students is 750.

GRANTS PASS, Ore., city, county-seat of Josephine County, on the Rogue River and on the Southern Pacific Railroad, in the southeastern part of the State, about 60 miles from the Pacific. It is the commercial centre of an agricultural, lumbering and mining region; and its chief manufactures are lumber, flour, lumber and brick making. It has large railroad repair shops. Crater Lakes and the railroad repair shops. Crater Lakes and the Oregon Caves are situated nearby and attract great numbers of tourists because of their scenic interest. Pop. 3,897.

GRANULATION TISSUE, the tissue formed in wounds to repair loss of substance. Through the clot in a fresh wound certain cells of the blood wander and begin to form new tissue. Blood vessels in tiny loops pass out from the sides of the wound. On the surface these loops form small rounded elevations, spoken of as «granulations.» As the process goes on, the new tissue contracts, drawing in the sides of the wound; the skin grows out in delicate points from the margins of the cut. If the granulations pass beyond the surface-line because of irritation, they are spoken of as «superfluous» granulations or «proud flesh.»

GRANVILLE, Granville George Leveson-Gower, 2D EARL, English statesman: b. London, 11 May 1815; d. there, 31 March 1891. He was educated at Eton and Oxford; entered Parliament in 1836 for Morpeth, afterward for Lichfield, both in the Liberal interest. He succeeded his father in the peerage in 1846. He became Foreign Secretary 1851–52. In 1855 he became president of the council, and ministerial leader of the House of Lords (1855–58). From 1859 to 1866 he was again president of the council, having previously failed to form a ministry under himself as premier. In 1868 he was Colonial Secretary under Gladstone, and in 1870 succeeded to the secretaryship for foreign affairs, which he held until 1874. During this period he negotiated the Treaty of 1870 guaranteeing the independence of Belgium, and «protested» against the Russian repudiation of the Black Sea clause of the Treaty of Paris. On the return of Gladstone to office in 1880 he was Foreign Secretary until 1885. During Gladstone's brief administration in 1886 he was at the colonial office. His ‘Life,’ edited by Lord Edmond Fitzmaurice, was published in 1905.

GRANVILLE, N. Y., village in Washington County, on the Delaware and Hudson Railroad, about 37 miles northeast of Saratoga Springs and 57 miles northeast of Troy. The village is in an agricultural section, but nearby are valuable slate and building-stone quarries. The slate is used for mantels, roofing and marbleized slating. The trade of the town is in stone and slate from the quarries, butter, cheese, hay and vegetables. There are manufactories of shirts, gloves, infants' wear and condensed milk. The waterworks are municipally owned. Population of the village of Granville, not including the several small villages, which are practically a part of it, was, in 1910, 3,920.

GRANVILLE, Ohio, village in Licking County, on Raccoon Creek, and on the Toledo and Ohio Central Railroad, about 25 miles northeast of Columbus. It has agricultural and manufacturing interests, but is chiefly noted for its educational institutions, which include Denison University (Baptist), the Shepardson College for Women, the Doane Academy and the Fanny Doane Home for Missionaries' Children. The electric-lighting plant is the property of the village. Pop. 1,394.

GRAPE CULTURE. The grape is believed to be the oldest of our cultivated fruits. Although some 1,500 varieties of grapes are cultivated in Europe, they are practically all from a single species of the vine, known as the *Vitis vinifera*. It is supposed to have been indigenous to Asia, where it was widely planted by different peoples centuries before it was introduced into Europe. The Phœnicians have the credit of introducing the culture of the vine into Europe, first into the islands of the Grecian Archipelago and thence into Greece and Italy. The Romans carried vine culture, as a part of their civilization, wherever they settled. Thus, the vine had become well rooted in the south of France, in the neighborhood of Marseilles, at the beginning of the present era. Its culture during the next 200 years spread northward.

The native grapes of America are of entirely different types from the European kinds. The reason is that America raises grapes largely for table, while the European grapes are grown for making wine. American grapes are (1) the native varieties, which are indigenous to the country; and (2) the vinifera, or European kinds, which have been transplanted here, and thrive outdoors only on the Pacific Coast, being suitable for wine.

The vine and its cultivation engaged the attention of early colonists, who were encouraged by the authorities and by the lawmakers. The Virginia assembly passed an act awarding premiums to successful grape growers. When the second charter was granted to Rhode Island by Charles II in 1663 it contained an inducement to anyone who would plant a vineyard. Queen Christina in her instructions to John Printz, governor of New Sweden, urged that vine growing be encouraged, and she instructed the governor to give the matter his personal attention.

Many of the immigrants to the different colonies came from noted vineyard districts of the Old World. It was only natural that they should try to introduce here the cultivation of those European vines with which they were most familiar. Thus, most of the early attempts to establish vineyards for profit were by foreign or foreign-born settlers. In 1792 or 1793 Pierre Legaux, a Frenchman, interested a number of Philadelphia gentlemen in his enterprise, and a company was incorporated for the purpose of planting vines. A vineyard was set out at Springmill, near Philadelphia, on the Schuylkill River. Foreign varieties of grapes were tried, but the experiment proved a failure.

About the same period (1790–93) a colony of Swiss grape growers from about Lake Geneva raised a fund of $10,000 and vineyards were planted in Jessamine County, Ky. Foreign varieties of grapes were tried, as had been done previously, but they all ran out and perished. Some years later, or about 1802, certain members of the Swiss colony removed to a place which they called New Switzerland (now Vevay, Ind.), on the Ohio River, 45 miles below Cincinnati. After failing with the best grapes imported from Switzerland, they tried a native variety called the «Cape,» or the «Alexander» grape, and they then met with some success. This was largely due to the skill and experience of one member, John James Dufour, who joined the colony about 1805. He was an intelligent and observing vine-dresser, and afterward wrote a small treatise on grape culture and wine making — one of the first books on the subject published in this country. Dufour produced wine, which had a fair sale in the West, but by 1835 or 1840 the wines of Vevay were little heard of, and a few years later the vineyards had nearly disappeared.

Such, in brief, were the leading attempts to introduce the cultivation of European grapes into the Eastern States, beginning in 1620; not one lasting success is recorded.

However, in 1851 the European grape was being grown with success about the different missions. The popular variety was a kind now known as the «Mission grape,» which is extensively cultivated in southern California to this day. Other and better of almost all the leading varieties of European vines have been planted in that State, and their cultivation was a success from the beginning. Our native grapes grow there also, but they are not cultivated to any extent west of the Rocky Mountains. Therefore, grape culture, especially in California, constitutes a separate chapter in American viticulture.

The Cultivation of American Grapes.— After experience had shown that European varieties of grapes would not thrive, practical horticulturists began to turn their attention to the native vines found growing wild, or partially cultivated. They saw that success lay in that direction. But the trouble was to obtain a native grape of superior quality for the table and for wine.

In 1819 Maj. John Adlum noticed a vine growing in a garden at Georgetown, D. C. The grape struck him as having many excellent qualities. He first supposed it to be a European variety, but the grape was really a native of North Carolina, where it was discovered in 1802, and it took its name from the Catawba River. Major Adlum was enthusiastic in his estimate of the value of the Catawba grape. In a letter, written shortly before his death to the Hon. Nicholas Longworth of Cincinnati, Ohio, he says: «I have done my country a greater benefit in introducing this grape than I would have done if I had paid the national debt.»

There is no doubt that the Catawba grape has played an important part in the grape and wine industry of the United States. This was largely due to the heroic efforts of Nicholas Longworth, who is called «the father of American grape culture.» He spent 40 years or more of his life and $200,000 in establishing vineyards in the Ohio Valley, and his wine cellars at Cincinnati, Ohio. His persistent effort to make the industry a success is a fine example of American energy and enterprise. Longworth obtained thousands of vines from Bordeaux and Burgundy, from the Rhine district of Germany, from Madeira (6,000 vines), and from the Jura (7,000 vines) in hopes of finding grapes which would thrive in his Ohio vineyards. He also tried native grapes, but most of these were given up for the Catawba, which he first received from Major Adlum in 1825.

Not only as a pioneer, but as a leader in grape and wine growing, Longworth exercised great influence on the industry. Many able and practical men in Cincinnati became interested in grape culture and, in 1848, the Cincinnati Horticultural Society estimated that within 20 miles of the city more than 1,200 acres were planted in vineyards. During the next three or four years, some six or eight wine cellars were established at Cincinnati. Longworth had two. At his cellars dry and sweet wines were made, and «sparkling Catawba»— the latter produced by fermentation in the bottle after the method of French champagne. It was after a visit to Mr. Longworth that the poet Longfellow wrote his celebrated poem on 'Catawba Wine.'

In 1858, Erskine made a report to the British government on the extent and condition of viticulture in the United States. He gave the vineyard area of the several States, as follows: 3,000 acres in Ohio; 1,000 in Indiana; 500 in Kentucky; 500 each in Missouri and Illinois; 300 in South Carolina; 200 in North Carolina; 100 in Georgia — a total of 5,600 acres of vineyard in the United States. Even at this time grape culture in the Ohio Valley was on the decline. The vines there were being steadily destroyed by mildew and rot. By 1865, these vineyards, which had promised so much pleasure and profit, and on which so much labor and money had been expended, were disappearing, and a few years later the grape and wine industry of the Ohio Valley became a thing of the past.

At that time the methods of successfully treating the two principal fungus diseases of the native vine — mildew and black rot — were not known to our viticulturists. Later on the discovery was made that black rot may be kept almost under control by a preparation of sulphate of copper, called the «Bordeaux mixture» — the cheapest and best fungicide ever introduced. As black rot prevailed from an early date in all the vineyards east of the Rocky Mountains, it was only after an efficient remedy was found that grape culture could become commercially profitable in the various Eastern States. In California, on the other hand, the vineyards were rather free from fungus diseases, but there, as in France, the phylloxera began its ravages about 1875, and has been the worst scourge of the vineyards on the Pacific Coast since then.

The Growth of Grape Culture in the Eastern States.— About 1865 the grape-growing industry became rooted in the Hudson River Valley, the lake regions of central and western New York and in northern Ohio, and on the islands in Lake Erie. New York, Michigan Ohio and Missouri are the leading States in the order named. New York's annual production is about 112,000 tons; but in all the other Eastern and Southern States grape growing exists on so small a scale as hardly to be termed an industry. Production exists rather because a large number of small farmers like to grow a few for local use.

The grape industry of the Hudson River Valley was fairly established in the early '60s. Here, the Isabella grape was the leading variety. Like the Catawba, the Isabella is regarded as a native of North Carolina. About 1810 a vine was sent from the South to Col. George Gibbs, who planted it in his garden at Brooklyn, N. Y. A few years later, one of the successful pioneer viticulturists of this country, William Prince, of Long Island, N. Y., introduced this variety to growers, and he named it the «Isabella» in honor of Mrs. Isabella Gibbs. For a long time the Isabella was the standard grape in the New York vineyards, but of late years it has given place to other varieties.

Several varieties of grapes of good quality originated in the Hudson River district. Perhaps the most desirable kinds were the Iona and the Eumelan. The former was originated by Dr. C. W. Grant, of Iona Island, N. Y. With the Delaware it is considered one of the finest flavored grapes of American origin. The Eumelan is more for wine making than for eating. The vineyards of the Hudson River district in 1890 comprised about 13,000 acres. Since then the industry has gone backward, and at the present time the vineyard area is estimated at from 8,000 to 9,000 acres. There are one or two wine cellars in this district, but about 80 or 90 per cent of the grapes raised along the Hudson River are sold for table purposes.

The Lake Keuka District.—Small plantings of vines were made at Hammondsport, N. Y., at the head of Lake Keuka, from 1850 to 1860. But it was not until after 1865 that the grape industry there began to assume some commercial importance. In 1890, when the statistics of viticulture were gathered for the first time in the United States, there were more than 12,000 acres of bearing vines in the Lake Keuka district, and the growers shipped 20,000 tons, or 40,000,000 pounds, of table grapes to market annually. In addition to that amount, some 5,000 tons of grapes were sold to the local wine dealers. The vineyard acreage in this section did not continue to increase so fast, and in 1910 there were in the district 15,000 acres of vines.

The vintage begins usually the first week in September, when the early varieties (such as the Concords and Delawares) ripen. It lasts until the middle of October, when the last of the Catawbas are gathered. The crop is picked in boxes, which hold from 35 to 40 pounds. The clusters of fruit are cut from the vines by grape shears. When the boxes are filled they are carried to the end of the rows, where they are gathered two or three times a day and taken to the packing-house. Here the grapes are sorted, and packed in 5- and 10-pound baskets. This work is done mostly by women and girls.

The bulk of the grape crop is shipped by fast freight to the large city markets — to New York, Boston, Philadelphia. Within the past few years new markets have been opened in the Far West, and now it is common to find New York State grapes for sale in Denver, Omaha, Kansas City and even in Manitoba. The experiment was tried of shipping grapes to England, but while the fruit arrived there in fair condition, the cost and prices received did not warrant making further efforts.

The Lake Keuka grape growers now have a long range of season — that is, they can supply table grapes from early in September till the following March and April. The early varieties cannot be held very long, but the Catawba, for example, which ripens late, is a "good keeper." The grapes are stored in crates or trays in a cool building or cellar, and by proper ventilation and by maintaining an even temperature they can be kept fresh and fair till spring. Some years ago the only grapes in market in mid-winter were hothouse grapes, which cost from 50 cents to $1.50 a pound. Now these outdoor-grown grapes can readily be bought in January or February at 5 and 10 cents a pound.

The wine industry has also made striking progress in the Lake Keuka district. From the two or three cellars the number has increased to 12 at or near Hammondsport, N. Y. This section of New York State is often called "the American champagne district," as it produces about two-thirds of all the champagne made in the United States.

There are two important areas of vineyards adjoining the Keuka district, namely, the Seneca Lake district of about 5,000 acres of vines in Seneca and Schuyler counties; the Canandaigua district of about 3,000 acres of vineyard bordering on Canandaigua Lake.

The Chautauqua Grape Belt.— This is the greatest single strip of vineyard in the Eastern States. It stretches from the hills surrounding Chautauqua Lake, in western New York, along the shore of Lake Erie for some 50 miles. The growth of grape culture in the Chautauqua district was remarkably rapid. The industry began about 1860, that is rather in advance of the Hudson Valley district. It grew and prospered, and in 1910 the Chautauqua grape belt contained about 30,000 acres of vines. The annual yield of this district is about 5,000 carloads of grapes. Each car holds from 2,300 to 2,500 baskets. In addition, probably one-third, or more, of this amount is used to make wine. The making of unfermented grape juice has become quite a large and growing industry in the Chautauqua district.

The bulk of the crop (about 80 per cent) is handled by an association of growers. The grapes are graded according to their quality, and the returns from the shipments are "pooled." Each grower gets his pro rata share, after deducting expenses. About 85 per cent of the grapes grown in the Chautauqua belt are of the Concord variety.

The Northern Ohio Vineyards.— Soon after the decay of grape culture in the Ohio River Valley, about Cincinnati, the industry became established in northern Ohio along Lake Erie. Here, the Catawba grape, which was destroyed by fungus diseases in the former locality, survived and soon became the leading variety. There are large stretches of vineyards all along the Lake Erie shore from Ashtabula to Sandusky. There are also several islands in Lake Erie covered with vines; of which Kelley's Island and Middle Bass Island are the best known. The total area of these vineyards in northern Ohio is estimated at from 8,000 to 10,000 acres. The Michigan grape industry became of some importance toward the close of the 19th century. It developed mainly in the southern portion of the State, and by 1910 the annual crop was 60,000 tons, valued at over $1,500,000.

Summary.— In the districts above described, the growing of grapes (both for the table and for wine making) is regarded as the chief industry. There are considerable vineyard areas in several of the Southern and of the Western States, and these may become important in the near future. New sections are being planted to vines from time to time; for example, of late years there has been quite an increase of vineyards in southern Michigan, and in the Ozark Mountain region of Arkansas and of southwestern Missouri.

Of American grape culture east of the Rocky Mountains two things may here be noted: First, although some 800 varieties are grown and flourish, yet the bulk of the crop in the leading districts consists of only two or three varieties, namely — the Concord, Catawba and Delaware; secondly, two-thirds of the grapes raised in the East are sold and used for table purposes, while only one-third of the crop is made into wine. It is just the reverse in California, for there two-thirds of the grape crop is turned into wine, the balance being used for raisins and the table. Therefore, not only in the fact that practically all of the grapes are foreign or European varieties, but in making wine the leading product of the vineyard crop in California is sharply defined from the industry east of the Rocky Mountains.

Grape Culture on the Pacific Coast.— Mention has already been made of the Spanish Fathers, who planted small patches of vineyards about their missions in southern California as early as 1770. The first plantings were at the mission of San Gabriel, and in the course of the next 75 years there were vineyards of from 5 to 25 acres extending from San Diego north as far as Sonoma County. The missions were abolished and their property confiscated in 1845.

The early settlers who began pouring into California in 1849 were more interested in gold than in grapes, and it was not until the year 1858 that a genuine widespread interest in grape growing arose in the new State. During the next three or four years many vineyards were planted, and the industry began to attract considerable attention, so much so that, in 1861, Governor Downey was authorized by the legislature to appoint three commissioners "to report upon the best means and ways to promote the improvement and culture of the grape vine in California." One of the commissioners appointed was Col. Agoston Haraszthy, who, by his writings and his efforts, was largely responsible for this renewed interest in grape culture. He went to Europe, visited the leading vineyard districts there and secured 100,000 vines embracing 1,400 varieties. These vines and cuttings were distributed from time to time in small lots to growers in different parts of California, and they formed a basis for the viticultural industry in that State.

The first, or experimental, era of the young industry may be said to go from 1861 to 1871. During this period the most popular grape was the old "Mission." It was hardy, vigorous and a good bearer. The "Mission" yielded a dry wine of rather inferior quality, which for some years prejudiced dealers and buyers against the California product. It will, however, produce a sweet wine, of the sherry type, of good quality.

After a while it was demonstrated that the fine wine grapes of Europe would succeed and flourish in different parts of California. And then French, German and Italian vintners turned their attention to the vines they knew or had grown in the Old Country.

After 1871 grape growing in the State began to go backward, and this continued till 1879, when there came a "turn" in the industry. There was a short crop that year; the prices for grapes and wine went up, and soon there was renewed interest in viticulture. In response to a demand, a State Board of Viticulture was created in 1880. The board was composed of able and practical growers from the leading districts of the State, and their work resulted in a revival of the industry.

According to the census of 1890, there were then in California 155,272 acres of bearing vines. The California grape crop in the census year of 1909 was 989,843 tons, of the value of $10,027,961. This is 77 per cent of the entire United States production, though only 49 per cent of the value, since most of the grapes are grown for wine, and bring a much less price than table grapes. A large quantity also goes into raisins. The California production more than doubled in the decade from 1899 to 1909. See RAISIN INDUSTRY, AMERICAN.

The shipping of California table grapes to the Eastern markets now amounts to about 1,200 carloads. The California shippers of table grapes labor under the difficulty of long distance from their markets. They have fine, beautiful varieties of grapes, but many of them will not stand the journey to the Eastern markets.

The leading varieties of California table grapes are Flame Tokay, Emperor, Cornichon, Black Malvoisie, Rose of Peru, Muscats, Thompson's Seedless, the Chasselas varieties.

Practical Side of Grape Culture.— The practical parts of vine growing cannot be learned from books, but is the result of hard work and years of experience. However, some of the more important features of vine cultivation may be mentioned. Of course, climate, location and soil play an important part in the yield and in the quality of the fruit. From early times the vine was generally set out on the hills with southern or eastern exposure. It is another curious fact that the leading grape districts of Europe and of the United States are located near a body of water. It is so in the great Medoc district of France, situated between the rivers Garonne and Gironde, and in Germany along the river Rhine. In the Eastern States we have the leading districts along the Hudson River, on the banks of Lake Keuka in central New York and along the shores of Lake Erie in northern Ohio. Such large bodies of water keep the vines from late spring or early fall frosts, and from heavy dews and fogs.

Propagation.— The propagation of the vine may be accomplished by seeds, cuttings, layers and grafts. The wild grape grows from, and multiplies by, the seed only. It reproduces itself, and its seedlings differ seldom from the parent vine. But, if we take the seed of the cultivated vine, the seedlings show a wide variation, and that is seldom wanted, unless as an experiment to obtain new varieties. The usual method of vine propagation is by cuttings, which are made in the winter from the trimming of the vines. The cuttings are planted early in the spring, after the ground is thoroughly well prepared. It is usual to let the plants grow one or two years. The methods of transplanting these vines are various, due to the nature of the vines and to the methods followed in the various districts. Thus, in California rooted vines of one year are preferred; in the Eastern States growers prefer two-year-old transplanted vines.

Grafting.— The grafting of the vine, as with other woody plants, is quite easy, although it may be done in a number of ways. The time to graft is early in the spring before the sap starts. Fully a dozen methods have been named and described. The two kinds in most common use are the ordinary cleft or shoulder-graft, and the English or whip-graft. An ordinary graft is simply done by cutting the vine off three or four inches below the surface of the ground, then split with a grafting chisel, and held open with a wedge until the scion is fitted exactly into place. The cleft may be tied with a string, or covered with clay or grafting wax, and then the earth is heaped about the graft, leaving one bud of the scion above the surface. Grafting is of great importance to every vine grower in Europe and in California. For it is by grafting European vines on American stock that they can be protected from that dread scourge, phylloxera.

Pruning and Training.— The value of removing a portion of the vine and other woody plants was recognized at a very early date. Most of our native grapes are more vigorous growers and show a greater tendency to climb and spread than do the European vines. Pruning relates to the removal of such parts of the vine as ensures better fruit and larger yield. The general principles of pruning are practically the same for all vines, and these principles as given by Prof. L. H. Bailey are: (1) Fruit is borne on wood of the present season, which arises from wood of the previous season; (2) a vine should bear only a limited number of clusters, and (3) the bearing wood should be kept near the original trunk or head of the vine. Thus, the wood is constantly renewed, and new shoots which give wood, or canes, for the following year, are called "renewals."

Training relates to the form and disposition of the different parts of the vine. It is not necessary to describe the different methods of training. Each large vineyard district has its own system.

Brief mention may be made of the three well-known ways of training the native vine outside of California: (1) The so-called "Kniffin system" first obtained in the Hudson River district. The vine is allowed to grow at will the first season after planting; the second year it is cut back two or three buds from the ground, and from the stub only one shoot is allowed to grow. This is tied to a stake, at intervals, as it grows, to keep it straight to the height of the trellis. In the third year posts are set about 16 feet apart between every two vines. Two wires are then stretched along the posts, the upper wire about five and one-half feet above the ground, and the lower one about half way between the upper wire and the ground. The vine is now tied to each wire, and cut off even with the upper one. The next year all the buds on the vine are rubbed off, except four — two for each wire. The two arms on the top wire are often bent down to the second wire, thus forming a droop, and the system is known as the «drooping system» of training.

(2) The Chautauqua system of vine training, as it may be called, is largely used in the vineyards of that district. In the first year the vine is cut back to three or four buds. The second year it is cut back to five or six buds, and three of the strongest shoots are left to grow the fruit-bearing arms for the third year. The trellis consists of three wires. Each year three or four of the strongest new canes are trained upon the trellis spread out in a fan shape.

(3) The Munson system of vine training is named after T. V. Munson, of Texas, a prominent viticulturist, and is adapted to the native vines of the Southern States. The trellis used is little different from that of the other systems. Thus, the posts are set about 24 feet apart, and carry two lines of wire. The vine is pruned back in the first year, and the next year the two arms may be allowed to bear a few clusters, if the vine is strong. The «bearing arms» are then cut back to one or two eyes each; the other arms to 8 or 10 eyes. These arms bear the next year, and are pruned for the third year quite short, while the bearing arms for the next year are pruned long. By this system of training there is a shifting of the bearing canes from one side of the vine to the other; all of which, it is claimed, gives vigor to the vine and a good distribution of the fruit.

Diseases of the Vine.— These are caused by animal and vegetable parasites. Of the former the worst and best known is the phylloxera. An American entomologist, the late Prof. C. V. Riley, discovered that some of our native American vines were infested by phylloxera, but they successfully resisted its attacks. He therefore recommended to the French and other growers of European grapes that they graft their vines on American stocks. This proved to be the solution of the problem, and practically all of the millions of vines planted in France during the past 25 years are on «resistant stocks,» or American species of vines. It is the same in California, where the vineyards destroyed by phylloxera have been and are being replaced by vines grafted on American stocks. The main thing now is to get the right «resistant vines» for different soils and different climates. The other insect pests are the grape leaf-hopper, the root-worm, the flea-beetle, thrips, rose-bug, etc.

The leaf- or vine-hopper often does considerable damage in the vineyards of the East as well as in California. The best remedy so far recommended is a solution of whale-oil soap applied in a spray. The root-worm is at present working in the vineyards of Chautauqua and in northern Ohio. Two or three sprayings of arsenate of lead during the season is recommended, but thorough cultivation is regarded as the best check to the root-worm. See INSECTICIDES.

The leading vegetable diseases of the vine are mildew, black rot, oidium, anthracnose, anaheim, etc. The effects of mildew are seen on the leaves, stem and the fruit. This disease is indigenous in this country, and first appeared in 1878 in Europe, where it spread over the vineyard districts, France, Germany, Italy and Spain, doing great damage.

Black rot was also introduced into Europe from the United States, but there it was not as serious as with us. The rot first affects the leaves and then passes to the fruit. The condition most favorable for the spread of both mildew and black rot is warm, moist weather. See FUNGI and FUNGICIDES.

The Evolution of American Grapes.— It should be noted, in conclusion, that the development of American grape culture has been a process of evolution with a survival of the fittest. Thus, the improvement in the quality of our native grapes has been something remarkable. It represents the difference between the wild grape — coarse, harsh and often disagreeable in taste and smell — and the cultivated grape — tender, luscious and sweet and delicate in flavor.

The botanists have described and put American grape vines into some 12 or 13 groups or classes. Only four American species of vines have been cultivated and developed to any extent, as follows: (1) *Vitis Labrusca;* (2) *V. Estivalis;* (3) *V. Riparia;* (4) *V. Rupestris.*

The *V. Labrusca* is generally known as the «fox grape,» and is a native of the Atlantic slope from New England to South Carolina. The largest number of varieties of grapes in all the Eastern States now cultivated spring from this species, which includes the Concord, the Catawba, etc.

The *V. Estivalis* is the «summer grape» of the Middle and Southern States. Several varieties (such as the Lenoir or Jacquez, Herbemont, Cunningham, etc.) have been much used in France and in California as a grafting stock.

The *V. Riparia* is the grape vine of the river banks, and is found growing wild from Canada to the lower Mississippi Valley. This species is very highly regarded in France and California as a stock on which vinifera vines have been grafted with success.

The *V. Rupestris* is native of the country west of the Mississippi River from Missouri to Texas. The varieties of this species have not been much cultivated, but are used, almost exclusively, as resistant stocks in France and in California.

Thus far, the efforts of our horticulturists to develop and improve many new varieties of American grapes have been confined to a few species. In 1830 William Prince enumerated but 88 varieties of native grapes; to-day there are more than 800 kinds. Already they have accomplished splendid results by cultivation, and by hybridizing our vines with the best foreign kinds. We may look in the near future for the production of many choice grapes which will combine all the vigor, beauty of foliage and resistance to disease of the Labrusca and other American families with the delicate and fine qualities of the vinifera, or European varieties.

Bibliography.— The most complete books on grape culture have been written by the French experts, but their writings do not apply to American grape culture. Among the best books on the subject in French we may name the following: Guyot's 'Etude des Vignobles de France' (3 vols., Paris 1876); Foex's 'Cours complet Viticulture' (Paris 1875), and Coste-Floret's 'Les Travaux du Vignoble' (Paris 1898). The leading journal is the *Revue de Viticulture,* published at Paris.

The total United States production of grapes as reported in the last census for the year 1909 was 1,285,533 tons, of the value of $22,027,961. This was one and a fourth times the production of 1899. California furnished over three-fourths, New York 10 per cent and Michigan 5½ per cent. About three-fourths of these grapes went into wine and raisins. The total wine and grape juice product in 1909 was 18,636,000 gallons, of which California made some 16,000,000 gallons. The most complete account of our native wines is found in the reports and bulletins of the Department of Agriculture. See also Wickson, E. J., 'California Fruits'; Hyatt, 'Grape Culture and Handbook for California'; Hedrick, 'Grapes of New York' (1907); Munson, 'Foundations of American Grape Culture' (1909), and the reports of the Board of State Viticultural Commissioners of California. See VITICULTURE; WINE-MAKING.

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GRAPE FERNS. See FERNS AND FERN ALLIES, *Ophioglossales.*

GRAPE, or GLOBE, HYACINTH. See HYACINTH.

GRAPE INSECT-PESTS. More than 200 species of insects have been observed preying on the grape vine in America. The principal pest is the phylloxera (*Ph. vastatrix*), which first attracted attention by its ravages in the vineyards of France about 1865. It now occurs in vine-growing countries all over the world, and is the worst of the very few insect-pests that have emigrated from America. It caused the destruction of 2,500,000 acres of vineyards in the United States in 1884. The phylloxera is a minute brownish plant-louse of the aphid family. (See APHIS). The winged females appear in Europe from August to October. Each lays about four parthenogenetic ova on the under surface of the vine-leaves. These ova develop in late autumn into males and females — wingless and without the characteristic piercing and sucking mouth-organs — which migrate to the stem of the vine. There each female lays a single egg under the bark. This egg lies dormant throughout the winter, and develops in April or May into a wingless but voracious "vine-louse." This form may pass to the leaves, on which it lays parthenogenetic eggs, and forms galls; but in Europe it attacks the roots, and lays its eggs there. From these in about eight days young develop, which become mature females in about 20 days, and lay more eggs in the roots. Half a dozen or more of these parthenogenetic generations follow in rapid succession throughout the summer. The roots become knotted and deformed; the whole plant suffers, and, though it may survive for several seasons, eventually dies. In midsummer, among the subterranean forms, a generation is born whose members, after four, instead of the usual three, moltings associated with adolescence, become the larger winged females with which we commenced.

The destruction of this scourge of the grape vine, without also injuring or destroying the plants, has proved exceedingly difficult when attempted upon a large scale, where the expense prevents the use of chemicals or methods effective in a small garden. Water, wherever it can be applied to the soil so as to saturate and keep it saturated for a time, has proved a safe and effectual destroyer, because the insect cannot live in a medium saturated with water for long. Chemical remedies, such as bisulphide of carbon, have succeeded, when injected into the soil about the roots. In some of the French vineyards grafting the cultivated vines on certain of the native vines of America has been tried with some success. Although the insect seems to feed on the roots of these vines, the greater vigor of the American stocks appears to enable them to resist the injuries inflicted on them.

An important vine-pest in certain parts of the United States is the grape root-worm (*Fidia viticida*). Injury is chiefly due to the work of the larvæ or "root-worms," but the beetles also injure the plants by gnawing many holes in the leaves. Arsenical sprays, the destruction of the beetles by jarring and of the pupæ in the ground by cultivation, are all useful. One of the most troublesome enemies of the vine is the rosechafer (*Macrodactylus subspinosus*), which is best kept in subjection by planting trap-crops of plants bearing white flowers which blossom at an earlier date than the grape, such as white rose, blackberry, spiræa and deutzia. The grape-vine flea-beetle (*Haltica chalybea*) does considerable damage at times to grape leaves, but can readily be destroyed with an arsenical spray, and may also be caught in the same manner as the plum curculio, by jarring the insects onto collecting frames saturated with kerosene. Nearly everywhere leaves will be seen drawn together and slowly assuming a brownish hue, and when these are opened a small caterpillar will be found actively wriggling about. This is the grape leaf-folder (*Desmia funeralis*). When vines are sprayed for leaf-feeding insects some of these leaf-folders will be destroyed, but picking and burning the affected leaves is more effective, taking care that the larvæ do not escape to the earth during the process. Leaf-hoppers do much injury in some localities, particularly on the Pacific Coast, and several other important enemies of the grape are known, including cutworms, which climb and defoliate vines at night, the grape-berry moth, which destroys the berry, and the grape curculio, which has the same habit. Consult Cornu, 'Etudes sur le Phylloxera vastatrix' (1879); Lichtenstein, 'Histoire du Phylloxera' (1878); Riley, 'Sixth Annual Report of the State Entomologist of Missouri' (1874); Saunders, 'Insects Injurious to Fruits' (1883); Bruner, 'Report of the Nebraska State Horticultural Society' for 1895, which gives an extensive bibliography; Marlatt, C. L. 'Principal Insect Enemies of the Grape' in *Farmer's Bulletins Nos. 70* and *284,* United States Department of Agriculture (Washington 1898).

GRAPE-SHOT is a combination of small cannon balls put into a thick canvass bag, and corded strongly together, or fixed in a cylindrical frame, the diameter of which is equal to that of the ball adapted to the cannon. The number of shot in grape varies according to the service or size of the guns; usually, however, a round of grape-shot consists of nine balls in tiers of three. Grape-shot is now supplanted by shrapnel (q.v.).

GRAPE-SUGAR. See GLUCOSE.

GRAPEFRUIT, POMELO, PUMMELO, SHADDOCK, a tree (*Citrus grandis*) of the family *Rutaceæ,* much resembling the orange, native of southeastern Asia, from whence it has been introduced in many warm countries. The name grapefruit seems to be derived from the fact that the fruits are often borne in clusters of three or more, much like a bunch of grapes. It is widely cultivated in the West Indies, California and southern Florida. It seems to have been introduced into Florida by the Spaniards in the early part of the 16th century, but commercial culture has been carried on only for about 25 years. In 1909, 1,061,537 boxes of fruit were produced in Florida and 122,515 in California, valued at over $2,000,000.

GRAPHIC METHOD, a pictorial method of representing statistics by lines. Force, motion or any other physical quantity, such as temperature, atmospheric pressure or barometric height, electric potential, etc., may be represented by straight lines. Graphic methods are largely employed in physical investigations as aids to calculation, and for the purpose of exhibiting the nature of the law according to which some phenomena vary. The principal use of this method is to show the mutual variations of two quantities. This we will illustrate by a particular example. Suppose a table is drawn up, in one column of which are the months of the year, and in the other the corresponding average temperatures of the air, at some particular place, during these months (the average temperature for each month being the mean of the daily temperatures). Let two lines, OX and OY, be drawn from O, one horizontally, the other vertically; let the successive months of the year be represented on any convenient scale along OX, and let temperature be measured along OY, also on a convenient scale. Corresponding to each month in the year there will be a length along OX, and to each temperature there will correspond a point on OY. At the middle point corresponding to each month draw perpendicular to OX a line representing the temperature on the scale of OY. A series of lines will thus be obtained, through the upper ends of which there may be drawn, freehand, a smooth curve. The points on the curve in the figure represent the upper ends of these lines. Other graphic methods involve the use of polar, logarithmic and other varieties of co-ordinates. (See GEOMETRY, ANALYTIC). A general glance at such a curve will reveal certain features regarding the temperature of the whole year; at what dates maxima and minima occurred; when the temperature rose or fell quickest, and so on.

GRAPHICAL STATICS. Graphical static deals with statics by purely graphical or draughting-room methods: constructions made with straight-edge, dividers, protractors, parallel rules, planimeters, etc. The analytic solution of a problem may give rise to a complicated formula, an infinite series from which it is difficult to compute, or to many simultaneous equations laborious to solve. Graphical methods overcome these disadvantages. They are very rapid in comparison with mathematical processes and quite precise when used carefully; they show at a glance the entire mechanism of solution. Although they give numerical answers — not formulas — that are only approximately correct, these results need never in engineering problems be less precise than the only approximately correct data. With average skill and good instruments it is possible to keep the thickness of points and lines within 0.005 inch and to set off distances of this size and angles of 0.1 degree. No graphical construction need have an error of more than 0.5 per cent, which is about the precision attainable with a small slide rule or with four-place logarithmic tables. All work is done to scale. Land, 'Die Maszstaebe bei der Zeichnerischen Loesung' (*Zeitschr. für Architektur u. Ingenieurwesen,* Heft 4, 1897) showed that the graphical units of length must satisfy the same relations as the functions themselves. Thus if $z = f(x, y)$ then $e_z = f(e_x, e_y)$ where e_x is the scale value of x; i.e., if x is pounds and the scale of pounds is, say, five pounds to the inch, then $e_x = 5$ and is represented by a line x/e_x inches long. Land gives a number of illustrations.

The entire subject is a direct development of the basic law of statics: the theorem of three forces. This is a form of the parallelogram of forces (see MECHANICS) and states that if three non-parallel, coplanar forces (all in one plane) are in equilibrium, the force vectors will be concurrent (through a common point) and will have such magnitudes and directions that they may be translated so as to form a closed triangle with the arrows running head to tail. Consequently if any number of concurrent, coplanar forces are in equilibrium their force polygon must close with the arrows pointing head to tail. For, any two of them can be replaced by a single force, this partial resultant can be combined with one of the remaining forces, and so on until the set is reduced to three which must satisfy the fundamental condition.

Four Forces.— Before dealing with non-concurrent systems we shall discuss the special case of four coplanar forces on account of its importance in engineering. The method was first extensively employed by Culmann in 1866. Forces in space are treated at the end of this article. If four forces are in equilibrium the resultant of one pair balances that of the other pair, or since it equilibrates the two remaining forces it must be coplanar with, and concurrent with or parallel to them.

If in Fig. 1 *P* is given and only the lines of action of *Q, R, S* are known, we have the construction shown, which fails, however, when (a) all four forces are concurrent or parallel, (b) three are concurrent or parallel.

Coplanar Forces in General.— If n forces $P, Q, R, \ldots. Z$ are in equilibrium any one of them will balance the resultant of the other $n-1$. The construction is made as follows: Resolve *P* into any pair of components *A* and *B,* combine B with Q, this resultant with S, and so on until Z is left. Then A, Z, and the resultant of the others must satisfy the theorem of three forces. The reader should have this process clearly in mind while studying the following illustration.

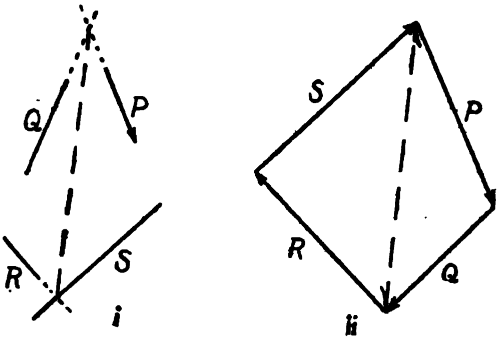

FIG. 1.

Let P, Q, R, S in Fig. 2 be in equilibrium; their vector polygon in ii will close. In ii resolve P into any pair of components A, B. Draw C (the resultant of B, Q) and D (the resultant of C, R, i.e., of B, Q, R); ii gives only magnitudes and directions, the actual positions being shown in i. The three concurrent lines A, B, P in i correspond to the triangle ABP in ii; similarly, in i, C must be concurrent with B and Q, D with C and R, and D with S and A. Before going further observe the peculiar correspondence between the two diagrams: three forces forming a triangle in ii have three concurrent parallels in i; but there are exceptions to the converse. This is a simple case of *reciprocal* diagrams or figures, which were so called by Maxwell, 'On Reciprocal Figures and Diagrams of Forces' (*Philosophical Magazine* 1864) who was the first to discuss their properties with any degree of completeness. Cremona, 'Le figure reciproce nella statica grafica' (1872), developed them into a branch of geometry. $ABCD$ in i was named the *funicular* polygon by Lamé and Clapeyron in 1826 for a reason which will be evident later. In ii $ABCD$ are the *rays* which meet at the *pole*. The fundamental property of the funicular polygon is that every vertex lies on a force, and conversely. Balanced forces form a closed vector polygon. This is necessary but not sufficient for equilibrium, and corresponds only to the conditions for concurrent forces. In order that the system may not have a resultant *moment* it is necessary that any force be at least collinear with the resultant of the rest of the set. Thus in i the sum of the moments of P, Q, R, S cannot vanish unless S lies on the line of action of the resultant of P, Q, R, i.e., unless S passes through A and D. This condition requires a complete or closed funicular polygon. Hence the graphical criteria of equilibrium are

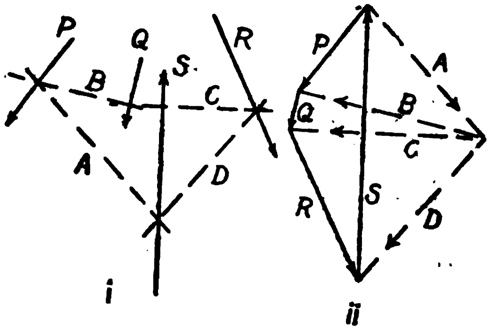

FIG. 2.

(1) *For equilibrium of translation the force polygon must close.*

(2) *For equilibrium of rotation the funicular polygon must close with a vertex on every force.*

The following solutions show how to apply these conditions.

I. *To find two unknown magnitudes.* Suppose that a weightless beam carries a load W and rests on two supports as in Fig. 3. It is required to find the reactions R_1 and R_2 which are evidently vertical. The answers are obtained as follows; it is left to the reader to supply the underlying statical reasons. In ii draw W and any rays a, b, and in i parallels to a, b, intersecting on W. R_1, as yet unknown, will be determined by some ray c also unknown. Now from the two triangles which any assumed ray c forms with a and b in ii we can find the two points of concurrence through which c must pass in i; this gives the true direction of c.

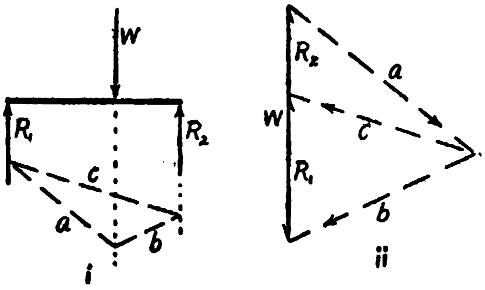

FIG. 3.

II. *To find two unknown magnitudes and one unknown direction.* The rod in Fig. 4 weights 200 pounds, rests on a knife edge, is hinged at the left, and is subjected to 200 pounds at the right. Find the reactions. In this problem we shall use a slightly modified form, due to H. T. Eddy, of the ingenious notation devised by R. H. Bow in 'The Economics of Construction in Relation to Framed Structures,' (1873); the full power of the nota-

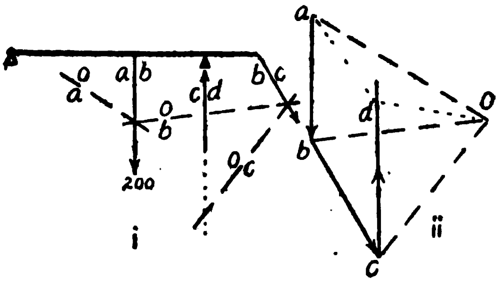

FIG. 4.

tion will not be evident until we take up frames. Letter the forces *ab, bc, cd, da,* naming first all those completely known, then *cd,* known only in direction, and finally the least known force — the hinge reaction *da* — of which only a point of application is given. The forces are to be used in this order. In ii draw *ab, bc* and rays from any pole *O*; this is as far as we can go. However, assume a

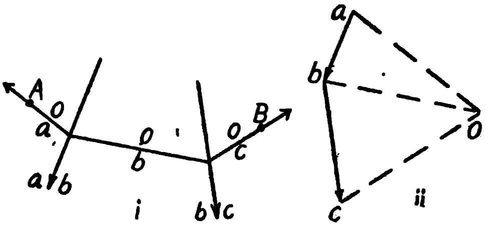

Fig. 5.

ray *Od* and imagine ii completed. In i draw *oa, ob, oc.* Now *od* must go through the intersection of *oc* and *cd* and of *oa* and *da* since it forms triangles with them. But the intersection of *oa* and *da* cannot be found unless *oa* passes through the hinge. Hence to solve a problem of this type, start the first ray through the only given point — usually a hinge — of the force whose direction is unknown; the solution is then easily finished. Observe that, for example, the sides *ob* and *oc* of the funicular polygon meet on the force *bc.*

III. *To find three unknown magnitudes.* Two of the unknown magnitudes can be replaced by a single force through their intersection, unknown in direction as well as in magnitude. The problem therefore is reduced to type II.

Properties of the funicular polygon. If a string, fastened at *A* and *B* is in equilibrium under forces *ab* and *bc* as in Fig. 5 it is evident that if *O* is properly chosen the sides of the funicular polygon will coincide with the lines of the *string.* (Latin, *funiculus*). The string polygon gives also the lines of thrust in an arch. The determination of the forces in a loaded cable or an arch requires the polygon to pass through two and sometimes three given points. Consider first the effect of shifting the pole. Assume, for brevity, two forces *ab, bc* and construct two funicular polygons with any poles *O* and *O′*, Fig. 6.

The pairs of forces *O′a* and *O′b* and *Oa* and *Ob* in ii have the same resultant, and if their senses are properly chosen they will be in equilibrium and form the quadrilateral *OaO′bO.* By the theorem of four forces the line through *P* and *R* must be parallel to *OO′*; by similar reasoning *Q* is also on this line. Hence corresponding pairs of sides of two polygons intersect on a line, called the ***polar axis,*** parallel to that connecting the poles. Consequently to pass a funicular polygon through two given points, say *P* and *P′*, proceed thus: draw any polygon through *P* and pass one side *o′b,* of another through *P′*. This determines a point *R* on the polar axis through *P.* Then *O′* must lie on a parallel to *PR* and on a ray *O′b* parallel to side *o′b.* Furthermore if the polygon is to go through another point *P″* (not shown) besides *P* and *P′*, the new polar axis must pass through *P, P′*. Hence from *O′* draw a parallel to *PP′*; the new pole *O″* will lie on it and its position will be determined by the direction of the side which is arbitrarily chosen to pass through *P″*.

Historical.— The germ of graphical statics dates back to Stevinus, ‘Beghinselen der Waagkonst’ (1585), who experimented with loaded cords. But the first systematic geometric treatment was published by Varignon, ‘Nouvelle mécanique ou statique’ (1725). For many years following, graphics was utterly neglected; indeed, Lagrange boasted that his great ‘Mécanique analytique’ (1788), a work of almost 800 pages, contained not a single diagram. Poinsot, ‘Statique graphique’ (1804), Lamé and Clapeyron (1826), Poncelet, ‘Cours de mécanique industrielle’ (1828), and Möbius, ‘Lehrbuch der Statik’ (1837) were the only important writers after Varignon. The studies of Maxwell, 1864, and Cremona, 1872, cited above, were the first of the modern investigations. To Culmann, whose ‘Graphische Statik’ appeared in 1866, belongs the honor of having produced the first great treatise on graphical statistics as a branch of technical mechanics. Among recent treatises Lévy, ‘Statique graphique’ (1886–88), Henneberg, ‘Statik der starren Systeme’ (1886), Müller-Breslau, ‘Die graph. Statik der Baukonstruktionen’ (5th ed., 1912) and Mohr, ‘Abhandlungen aus dem Gebiete der technischen Mechanik’ (1905) are perhaps the most important. Mohr's researches, extending over a period of 40 years, are the most noteworthy since those of Maxwell and Culmann; he has enriched nearly every department of structural mechanics.

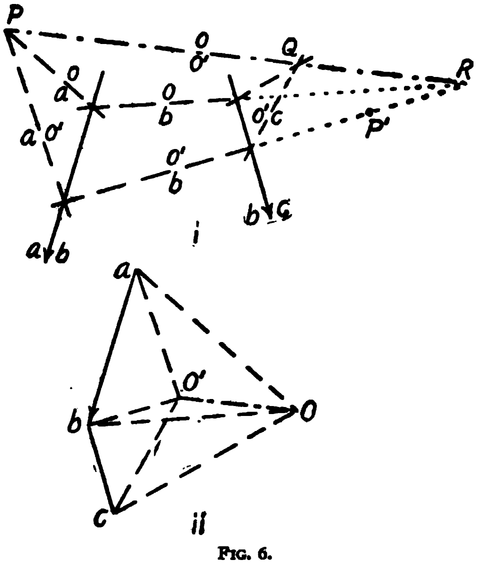

Fig. 6.

Frames.— The principal statical systems to be studied by the aid of graphics occur in such structures as bridges and buildings. A frame is a structure built up of rods or links so as to form a geometric net work. It is jointed or pin-connected if its members are hinged by a single pin or rivet at each joint. If the joints are made rigid the frame is statically indeterminate but its internal reactions can be obtained by assuming elastic deformation to take place. The forces which arise in this case are called secondary stresses. Engesser and Manderla made the first successful studies of them in 1878 and 1879; for the literature see Gehler, 'Nebenspannungen eisener Fachwerkbrücken' (1910). Consult also the books by Grimm and Johnson cited below under *graphical solutions.* Since the jointed triangle is the simplest frame it is usually chosen as the structural unit. It was used in ancient Roman and Egyptian constructions, and by the 16th century fairly complicated structures had been built. The external reactions on a frame cannot be found if they contain more than three unknown elements because there are only three conditions for the equilibrium of the frame as a whole. For this reason the fastenings of a structure to its abutments (supports) must be designed to secure rigidity without introducing more than three unknowns, and to allow slight motion due to deformations caused by elastic yielding and temperature changes without permitting the structure appreciably to change its position. Without going into the details of actual construction, we shall divide them into two types: hinge support to permit turning, and flat abutment to allow sliding.

Statically determinate structures.— A struc-structure is statically determinate when all external and internal forces can be found from the conditions for equilibrium of a rigid body without regard to elastic or temperature deformations. The idea is due to Möbius. For each link of a pin-connected frame there are three equations of equilibrium and for each pin two equations. (See MECHANICS). Hence a frame containing l links and p pins will yield $2p + 3l$ equations. Although the frame as a whole will give three more equations, containing, however, only external reactions, they are superfluous because they can be derived from the $2p + 3l$ equations by eliminating the internal forces. Or from another point of view, the whole frame is in equilibrium if every part is. Consider now the number of unknown quantities. The reaction at a hinge or pin is unknown in both magnitude and direction, or else consists of two forces unknown in magnitude but given in direction. That is, since each link can be held in equilibrium by two forces at each end, l links require $4l$ unknown external magnitudes, the opposites of which act on the pins. In addition to these there are in general three unknown external elements: total, $4l + 3$. As the number of equations must equal the number of unknowns

$$l = 2p - 3,$$

which is the criterion to be satisfied by a statically determinate frame. One link with three pins counts as three links, being statically equivalent to a collapsed triangle; likewise, one link with n pins counts as $2n - 3$. By similar reasoning we find that l links will rigidly interconnect f frames if $l = 3f - 3$. Observe that $2p - 3$ is odd. If n links meet at every pin, $\frac{n}{2}\,p = 2p - 3$ because each link connects two pins; since p is a positive integer, $n = 2$ or 3 and $l = 3$ or 9: see Fig. 7. A frame is *redundant* or over-rigid if it has more than enough links, and deformable if it has less. Some frames which satisfy the criterion may be indeterminate and vice-versa; this is due to special elements in their configurations. For example in Fig. 7, i, ii and iii are all constructed in about the same way. But the forces in ii and iii cannot be determined because instantaneous centers (see KINEMATICS) can be found for the parts above the section lines S. On the other hand v should be indeterminate but is not; vi is interesting because it contains no triangles at all.

Graphical solutions.— Graphical methods of solving problems in statics depend on several powerful theorems:

I. A body on which forces act at only two points transmits force along the line joining those points. The theorem of four forces is a special case, the points being the two intersections.

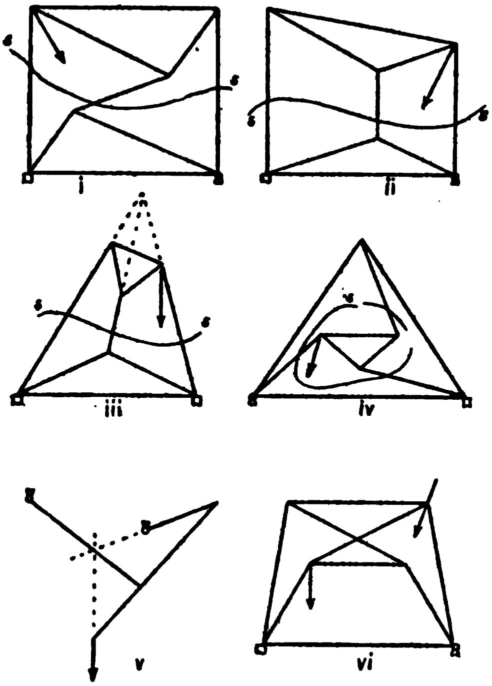

FIG. 7.

II. Three forces in equilibrium are either concurrent or parallel. This is the basis of the funicular construction.

III. A force on a rigid body can be replaced by any set of its components without disturbing equilibrium. In an elastic body the state of internal stress would be altered by such a substitution. By means of III we can replace the weight of members, and roof, snow and wind loads by their equivalent components acting at the pins of a frame.

IV. The equilibrium theorems as expressed by the force and funicular polygons and the reciprocal diagrams explained below.

V. Theorems based on the principle of work and virtual displacements. These cannot be dealt with in a brief exposition. Consult Hudson, 'Deflections and Statically Indeterminate Stresses,' (1911); Johnson, Bryan and Turneaure, 'The Theory and Practice of Modern Framed Structures' (9th ed.); Grimm, 'Secondary Stresses in Bridge Trusses.'

Reciprocal diagrams.— A frame acted on by pin loads or by intermediate forces replaced by their equivalent pin components, consists statically of as many sets of concurrent forces as there are pins. The resulting tensile and compressive forces in the members, which are two-point pieces, can be obtained in several ways, but in many problems in structural engineering the graphical solution can be carried systematically as shown in connection with Fig. 8. i shows a simple roof truss carrying a load W and resting on supports; the reactions are vertical. They are to be found in the simplest way; in this case, from the symmetry, each is $W/2$. Now put letters in the spaces between the forces, and numbers in the panels. The load W is then called *ab*, the reactions being *bc* and *ca*. The force in the vertical member is either 12 or 21 according to the pin on which it acts; in the member between A and 1 it is *a*1 or 1*a*. This is Bow's notation, mentioned above. Draw the external force polygon *abca*, taking the forces in alphabetical order. At the left pin there are three forces *ca*, *a*1, 1*c* which must be named and used around the pin in the order the letters have around the truss: clockwise in this case. Since *ca*, *a*1, 1*c* are in equilibrium they will form a triangle which is to be attached to the force polygon as in ii. In the triangle, *a*1 (not 1*a*) acts from *a* towards 1 and therefore pushes on the left pin of the truss; *a*1 is thus in compression. 1*c* is in tension because 1*c* (not *c*1) acts from 1 to *c* and represents a pull. The quadrilateral for the top pin forces 1*a*, *ab*, *b*2, 21 is drawn in ii; similarly for the other pins. No pin can be used at which more than two unknowns act. Consider now the free body cut out by the line *ss*. Corresponding to the forces on it — 1*a*, *ab*, *b*2, 2*c*, *c*1 — there is a polygon 1*ab*2*c*1; the same is true of *any* part of the truss as a free body. Conversely, for every force polygon in ii there is a free body in equilibrium in i. This is the most general form of the reciprocal relation already seen in the funicular and force polygons. The diagrams in Fig. 8 are called Maxwell-Cremona diagrams; they were used independently however by Rankine, 'Applied Mechanics' (1857) and shortly afterwards by W. P. Taylor, a practical draughtsman.

Henneberg's method.— The Maxwell-Cremona construction cannot be employed in all cases. In Fig. 7, i and iv, there is no pin at which there are only two unknowns, but by using the theorem of four forces on the parts cut out by the section lines *ss*, some of the internal forces can be found; the method then applies. Fig. 7, vi, cannot be solved by any method explained above. An ingenious graphical solution which has not yet become current in textbooks was devised by Henneberg, 'Statik der starren Systeme' (1886). The frame in Fig. 9 will serve to illustrate the procedure. F_3 is given and F_1, F_2 are found in any convenient way. In order to make the structure *indeterminate* introduce a link L anywhere. Being indeterminate it has an infinity of solutions two of which are to be got thus:

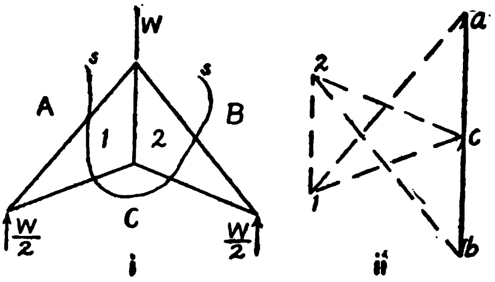

FIG. 8.

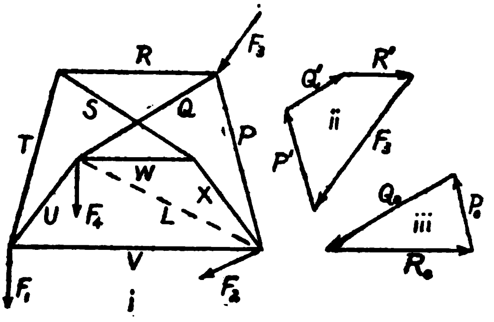

FIG. 9.

(a) Select any pin at which there are not more than three rods, e.g., that at F_3; this will always be possible — see the discussion of determinateness above. Draw *any* polygon ii for it and find the remaining forces (not shown). Observe that P', Q', R' are not the required forces in the links of the given frame; they are merely those forces in the members of the redundant frame which can equilibrate F_3.

(b) The redundant frame may have initial stress, i.e., if L or any other link is too long or too short it will produce stress in all the members without the aid of external forces. Find any set of initial forces P_0, Q_0, R_0 as in iii for the pin at F_3 and then find the rest L_0, S_0, T_0 .... (not shown).

If P, Q, R, S, ... are the actual forces before L is introduced we have for the pin F_3 the *vector* sum

$$F_3+P+Q+R=0. \qquad \textit{(required forces)}$$

From ii, $F_3+P'+Q'+R'=0$ (*assumed forces*)

$$\therefore\ (P-P')+(Q-Q')+(R-R')=0 \quad \ldots. \quad (1)$$

From iii $P_0+Q_0+R_0=0$ (*initial forces*) . . . (2)

Since the sides of the triangles represented by (1) and (2) are parallel.

$$\frac{P-P'}{P_0}=\frac{Q-Q'}{Q_0}=\frac{R-R'}{R_0}=\lambda,\ \textit{say}. \ \ldots \quad (3)$$

It is on account of the triangles that a three-link pin was selected. In the same way we find for the upper left pin

$$\frac{R-R'}{R_0}=\frac{S-S'}{S_0}=\frac{T-T'}{T_0}=\lambda \text{ [by (3)]} \quad \ldots \quad (4)$$

For the lower left pin

$$\frac{T-T'}{T_0}=\frac{U-U'}{U_0}=\frac{V-V'}{V_0}=\lambda \quad \ldots \quad (5)$$

For the pin at F_4

$$(Q-Q')+(L-L')+(U-U')+(W-W')=0$$

$$\text{and } Q_0+L_0+U_0+W_0=0$$

Since in these two quadrilaterals Q_0 and U_0 are proportional to $(Q-Q')$ and $(U-U')$ by (3) and (5), the quadrilaterals are similar, whence

$$\frac{Q-Q'}{Q_0}=\frac{L-L'}{L_0}=\frac{W-W'}{W_0}=\lambda; \ldots (6)$$

and so on for the other pins. Hence there are the equations

$$\begin{aligned} L &= L' + \lambda L_0 \\ P &= P' + \lambda P_0 \qquad \ldots \quad (7) \\ Q &= Q' + \lambda Q_0 \\ &\ldots\ldots\ldots\ldots \end{aligned}$$

where $P, Q, \ldots$ are the required, $P', Q', \ldots$ the assumed, and $P_0, Q_0, \ldots$ the initial forces. Tensions are positive hence in this case Q' should be negative. The correct value of L is zero because the redundant link is unnecessary for rigidity;

$$\lambda = -\frac{L'}{L_0}$$

so that $P, Q, \ldots$ can be found from (7). The solution may be shortened by taking one of the assumed forces, as R', to be zero.

Space forces. The graphical equilibrium conditions for concurrent forces in three dimensions are obtained from Fig. 10.

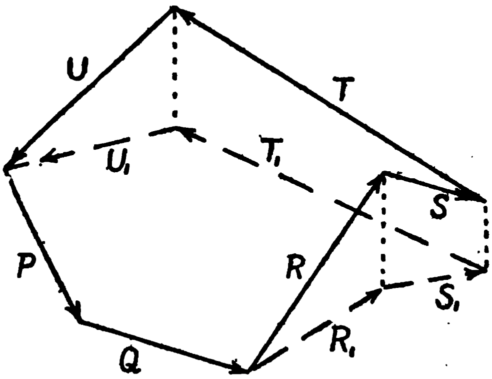

FIG. 10.

$P\,Q\,R\,S\,T\,U$ is a closed space polygon and $PQR_1S_1T_1U_1$ its projection on the plane of PQ. It is possible for $P\ldots U_1$ to be closed while $P\ldots U$ is open, for instance when the tail of S is vertically above the head of R; but then no other projection of $P\ldots U$ can close. Without putting the argument into more formal shape we may at once conclude that *the necessary and sufficient conditions for the equilibrium of concurrent forces in space are that the projected polygons on two non-parallel planes shall close.* The theorem of four forces in three dimensions follows from the fundamental theorem of three forces: the resultant of one pair must balance, and therefore be coplanar with, the other pair. For non-concurrent space forces in general, the conditions for equilibrium are derived at once from the fact that if any system is in equilibrium its projection on any plane is also. The projections on the three co-ordinate planes of XYZ axes give three closed force polygons and three closed funicular polygons if the original system has no resultant force or no resultant moment. It is easy to show, as in the case of concurrent forces, that two closed force polygons are sufficient to make the resultant force vanish. On the other hand all three funicular polygons are necessary because each corresponds to a moment condition: the moment of a force may be zero about two non-parallel axes without being zero about a third axis. There are then five necessary and sufficient conditions for the equilibrium of the most general system of forces:

Two closed force polygons on non-parallel planes,

Three closed funicular polygons on non-parallel, non-collinear planes.

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GRAPHITE, crystalline or amorphous carbon. It crystallizes in rombohedral forms, but is commonly foliated or earthy. It has a gray metallic lustre, and is greasy to the feel. Its hardness is 1–2 and its specific gravity 2.1–2.2. The better grades of natural graphite contain 90–95 per cent of carbon, the impurities being chiefly earth or rock. It occurs as an original mineral, minutely disseminated through many igneous rocks. Its most common occurrence, however, is in beds of highly metamorphosed rocks of sedimentary origin, probably representing original organic matter, from which, by heat and pressure, the volatile hydrocarbons have been driven off, leaving pure carbon behind. It probably represents the extreme end product in the same process that forms coal (q.v.), Most of the domestic supply comes from pre-Cambrian rocks in the Adirondack region of New York. Rhode Island is also a producer. Canada and Bavaria yield important quantities, while Ceylon is the world's chief producer. Because of its refractory character it is used in the manufacture of high temperature crucibles. It is also used in paint, and as a lubricant. Much of it is used in making lead pencils (so-called "blacklead"). Graphite is made artificially at Niagara Falls, N. Y., where large quantities of anthracite coal and other forms of amorphous carbon are converted to this product. The electric furnace process renders it possible to make graphite of the highest purity, and also possessing certain definite chemical and physical properties.

The annual electric furnace production of graphite at Niagara Falls amounts to over 13,000,000 pounds, the production increasing rapidly to meet the demand. About 30 different grades of artificial graphite are now produced. The art of making graphite in the electric furnace was invented and developed by Edward G. Acheson (q.v.) to whom credit for creating carborundum (q.v.) is also due. Dr. Acheson is also the inventor of deflocculated graphite, which is graphite reduced to the molecular condition, this latter process being operated in Port Huron, Mich. In the deflocculated form graphite diffuses itself through water and oil, and is the basis for valuable new lubricants known as oildag and aquadag (qq.v.). See ELECTROCHEMICAL INDUSTRIES.

Production.— The amount of crystalline or flake graphite mined in the United States in 1916 exceeded that of any previous year, and showed an increase of 55 per cent in quantity and 117 per cent in value over the output for 1915. The 18 mines which were active produced 10,931,989 pounds, valued at $914,748. Alabama continued to be the leading producer, her seven mines yielding 5,226,940 pounds — 48 per cent of the production of the whole country. Pennsylvania's five mines, with a combined output of 1,095,716 pounds, retained her in second place. In New York, three mines were active; in California, one; in Montana, one, and in Texas, one. Of amorphous graphite, the domestic production totaled 2,622 tons, mined in five States — Colorado, Michigan, Nevada, North Carolina and Rhode Island.

Imported graphite continued to dominate the market, constituting 85.4 per cent of the total supply of the crystalline form — mostly from Ceylon — and 80.5 per cent of the amorphous supply — largely from Mexico and Chosen. The amount imported in 1916 was 64,120,000 pounds of crystalline graphite and 10,857 tons of amorphous graphite. The enormous increase in the 1916 consumption of graphite in the United States above that of 1915, amounting to 66 per cent in crystalline, and 156 per cent in amorphous graphite, is attributed to the remarkable expansion in the electrochemical industries, and the consequent demand for graphite electrodes.

GRAPHOPHONE, an apparatus similar in principle to the Edison phonograph (q.v.), and designed to reproduce human speech and other sounds. It was invented conjointly by Messrs. C. A. Bell and Charles S. Taintor.

GRAPHOTYPE, a process of engraving discovered in 1860 by De Witt Clinton Hitchcock, by which the valuable improvement is effected of enabling the artist to be his own engraver. The discovery is utilized in the following manner: French chalk is by a careful process ground to the finest powder, which is repeatedly passed through a wire-cloth with 10,000 holes to the square inch. It is then laid between a smooth plate of zinc and a smooth plate of steel and submitted to intense hydraulic pressure, after which it is sized to prepare it for the artist. The pencils used by the artist are of sable-hair, and the ink is composed of lamp-black and glue. The drawing, when finished, is gently rubbed with silk velvet or fitch-hair brushes until the chalk between the ink lines is entirely removed to the depth of one-eighth inch. The block is then hardened by steeping it in an alkaline silicate, by which the whole of the chalk is converted into stone. Molds are then taken of it, from which stereotype plates are cast for printing. See ZINCOTYPE.

GRAPTOLITOIDEA, an extinct order of colonial animals the position of which in the animal kingdom is only imperfectly known. While it is usually supposed that they are *Hydrozoa*, it has been suggested that they are *Bryozoa*. They are confined to the Lower Palæozoic and are especially common in shales, where their chitinous exoskeleton is found pyritized or carbonized. The colony seems to start in its development from a single conical compartment called the sicula. From this start one or more branched or unbranched tubes called common canals, each opening into one or more extremely regular rows of cup-like hydrothecæ, which probably constituted the exoskeletons of individual polyps. The method of branching and the angle between branches is quite definite in a given species. In the wall of a single-rowed common canal on the side opposite the hydrothecæ or in the centre of a double-rowed common canal there is usually a peculiar bar of tissue prolonging the conical end of the sicula, and known as the virgula. The graptolites are extremely important in the correlation of different geological formations, for it seems that they were attached to seaweeds, and floated with them to all parts of the ocean, so that their rapid distribution was assured. The many changes which they underwent is also an aid to the dating of rocks in which they occur. Consult Bassler, 'Dendroid Graptolites of the Niagaran Dolomites at Hamilton, Ontario' (Bulletin of the Smithsonian Institution No. 65, Washington 1909); Rüdemann, 'Graptolites of New York' (Memoir New York State Museum, Nos. 7 and 11, Albany 1905–08).

GRAS, Felix, Provençal writer: b. Malemont, near Avignon, 3 May 1844; d. Avignon, 4 March 1901. His education ceased at 17, when he returned to his father's farm, from which he was sent, in 1864, to Avignon and articled to Jules Giéia, a man of letters as well as a lawyer, and a membef of Félibrige, a Provençal literary club of which Frederic Mistral (q.v.) was a member. Amid such surroundings he accepted law as his profession but resolved on literature as his vocation. In 1876 he published his first important work, an epic poem in 12 cantos, 'Li Carbounie,' which won for him the first place among Provençal writers of the younger generation. 'Toloza,' an epic recounting the crusade of Simon de Montfort against the Albigenses, followed in 1882. He proved himself second only to Mistral among Meridionals by a collection of his shorter poems to which he gave the title 'Lou Roumancers Prouvençal' (1887). In his collections of prose stories, 'La Papalmo' (1891), he fancifully describes, in vivid, racy style, the loves and hates, sensuality and "superstition" of the papal court at Avignon. His greatest popular success, 'Li Rouge dóu Miejour' (1896), was published in a translation, 'The Reds of the Midi,' before it saw the light in France, where it is not so popular as among those who read it in the English version alone. A more recent work, which has been translated in the United States under the title 'The White Terror,' describes the retaliatory violence of the Royalists in the south, when the storm of the Revolution had swept by. For 10 years previous to his death he had been Capoulié, or president of the Félibrige. See REDS OF THE MIDI, THE.

GRASMERE, grăs'mēr, England, village, in Westmoreland County, on the lake of the same name. It has been made famous by the "Lake School of Poets," Wordsworth, Southey and Coleridge. Many places in Grasmere and the surrounding lake country have been mentioned in the poems of the authors who frequented this section, especially by Wordsworth. The graves of Wordsworth and Hartley Coleridge are in Grasmere.

GRASS. See GRASSES IN THE UNITED STATES.

GRASS, China. See RAMIE.

GRASS, STRAW, or **PAMPASS CAT**, a wildcat (*Felis pajeros*) of southern South America, common on the grassy plains. It is described by Hudson ('A Naturalist in La Plata,' 1892) as not unlike the European wildcat in its robust form and dark color, «but a longer, more powerful animal, inexpressibly savage in disposition.»

GRASS-BASS, the calico-bass (q.v.).

GRASS-FINCH. See VESPER SPARROW.

GRASS-PINK, or CALOPOGON, a showy orchid (*Limodorum tuberosum*), with a small bulbous root, large ovate leaves, sheathed at the base, and flowers growing in a loose spike upon a slender stem 12 to 18 inches high; they are butterfly-shaped, fragrant and magenta pink; and the lip, which is exquisitely bearded with gay colors, remains on the upper side of the flower, giving the blossom an upside-down appearance. It is common in boggy places from Florida to Newfoundland. Several other species of the genus occur in the South, one of which (*L. multiflorum*) bears many more flowers than does the grass-pink.

GRASS-SNAKE. See GREEN SNAKE.

GRASS-SNIPE, a gunner's name for the jack-snipe (q.v.), and some other shore-birds of similar habits.

GRASS-TREE, the popular name for certain tree-like Australian rushes of the family *Juncaceæ*. Their large stems are crowned by thick tufts of narrow, pendulous foliage and by cylindrical flower-spikes like exaggerated cat-tails. The plants contain an aromatic resin (Botany-bay gum or gum acaroides) employed in pharmacy, and also used by the natives for a variety of purposes, such as calking canoes, and as a cement or glue. These plants are also called «black-boys» from the appearance of the stems when charred by fire, and from the fact that the black-skinned natives often use them as a means of concealment, or even imitate the appearance of a charred stem by crouching into a similar attitude, and so escape the eyes of enemies.

GRASS VALLEY, Cal., city, in Nevada County, on the Nevada County Narrow Gauge Railroad, about three miles northeast of Marysville and 65 miles northeast of Sacramento. It was one of the first settlements made after gold had been discovered in the State. It is in a rich gold quartz mining region, and the chief occupations are connected with mining. It has granite and marble works, a distillery and large wineries. It contains a public library, high school and two orphan asylums. It is the seat of Saint Mary's Academy. Pop. 4,520.

GRASS WORM, the caterpillar of a noctuid moth (*Laphygma frugiperda*), which often does great damage to grasses and cereals in the Southern States, and to a great variety of crop plants, as in 1899, when a serious outbreak of this species extended from Mexico to Chicago. In the North it is known as the fall army-worm, from the fact that it appears and travels in greatest numbers in the autumn, devouring nearly every form of vegetation encountered in its line of march.

GRASS-WRACK, a maritime grass. See EELGRASS.

GRASSE, François Joseph Paul, frāṅ-swä zhō-zĕf pōl gräs, COUNT DE, French admiral: b. Valettes, Provence, 1723; d. Paris, 11 Jan. 1788. He first entered the navy of the Knights of Malta, and served against the Turks; in 1749 entered the French navy, became captain in 1762, and rear-admiral in 1778, and was appointed to command a squadron sent to the West Indies. In 1781 he was given the rank of admiral and sent with a fleet to co-operate with the land forces in the American colonies. He first assisted at the taking of Tobago, in the West Indies, then sailed to the mouth of the Chesapeake, where he repulsed the attack of the British fleet under the command of Graves, prevented aid from reaching Cornwallis at Yorktown and cut off his retreat, thus materially assisting the decisive American victory there; for these services he received the thanks of Congress. He then went to the West Indies, where for a time he was successful against the British, capturing the island of Saint Christopher; but on 12 April 1782 was surprised by the English fleet under Rodney, and after a hard fight defeated, and taken prisoner. He was accused of carelessness and even treachery, but was exonerated by an official investigation, and at the time of his death held the rank of lieutenant-general of the naval forces of France.

GRASSERIE, a disease of silkworms (q.v.).

GRASSES IN THE UNITED STATES. The term «grass» is popularly applied to the green herbage on which cattle and other beasts feed, and thus includes many plants which are not botanically related to the true grasses, such as the clovers, alfalfa, sanfoin, vetches, spurry, etc., frequently referred to as «artificial grasses,» while it excludes some of the most important of the true grasses, namely, the cereals. The true grasses constitute the botanical family *Gramineæ*. They are distinguished from related groups of plants in that the leaves are arranged in two opposite rows on the stem, with a single leaf at each joint. The stems (culms) are usually hollow except at the joints, and the base of the leaf forms a sheath which surrounds the stem above the joints. The sheath is usually extended a short distance above the base of the blade of the leaf, in a delicate, whitish structure closely surrounding the stem, called the ligule, the office of which seems to be to prevent rain-water from percolating between the sheath and the stem. The grass flower usually consists of the following parts: flowering glume, palet, lodicule, one to six stamens (usually three), and a one-celled ovary usually with two styles tipped with plumose stigmas. The flowers are usually arranged in two rows on opposite sides of the rachilla, constituting a spikelet. At the base of the spikelet are usually two empty glumes. The empty glumes, flowering glumes, and palet constitute the «chaff.» The spikelet may contain one to many flowers. The lodicule, which stands in front of the flowering glume, is very small, usually not noticeable except on close examination. At flowering time, the lodicule becomes greatly swollen, and by this means spreads the flower open. In spikelets that contain several flowers, the palet, or inner chaff, rests with its back against the rachilla, and is concave on the back, with a nerve or keel on either side. The edges of the palet are overlapped by the edges of the flowering glume, or outer chaff. The spikelets are arranged either in spikes, as in wheat, or in panicles, as in oats. Popularly, these are referred to as the «seed-head,» and this term will be frequently used in this sense in this article. The fruit of the grasses is a seed-like grain, either adherent to the chaff, as in barley, or free from it, as in wheat.

This is one of the largest and most widely disseminated families of plants, and by far the most important to mankind. It includes the cereals, wheat, oats, barley, rye, rice, millet and corn, sugarcane, sorghum, the cane of the Southern canebrakes and the bamboo of the Old World, in addition to the common grasses of the fields and prairies. It furnishes the principal food of both man and beast, and some of the most beautiful ornamental plants (reed, Ravenna grass, plume-grass, ribbon-grass, etc.). The grasses are the foundations of agriculture. Their principal development is in the temperate zones, though grasses are found wherever vegetation flourishes. Singularly enough, the most important grasses, the cereal grains, are not known in the wild state, and their cultivation extends so far back into antiquity that even their places of origin are unknown. Either their wild counterparts have become extinct or the cereals have been so changed by cultivation that their wild forms are no longer recognizable. (Wild plants have recently been discovered in Palestine that are believed to be the progenitors of wheat). There are in all about 4,000 distinct species of grasses known. The species of only two natural orders of flowering plants exceed this number, namely, the *Compositæ* and the *Leguminosæ,* though in the number of individual plants the grasses far surpass all others. The total number of grass species growing in the United States is about 1,400; in the limits of the State of Washington about 275 species are found. Originally, nearly half the area of this country consisted of prairies, the principal herbage of which was grasses. The existence of these vast stretches of grassland has never been fully accounted for. It is not due simply to climatic and soil conditions, for many species of trees readily grow on the prairies when placed there by man. In recent years, vast areas that were formerly occupied by grasses have been invaded by various shrubs and trees, particularly the mesquite tree of the Southwest. This has occurred simultaneously with the destruction of the grasses by stock, indicating that the presence of the grasses is inimical to forest growth. It is well known that grasses thrive best on the more compact soils. On such soils, the abundant growth of grass, with the fires that have swept over these regions in dry seasons from time immemorial, has kept in check those classes of vegetation which could not quickly recuperate after the destruction by fire of their aerial portions. On the coarser types of soil, the sparse growth of grass, and the consequent lack of fuel to feed the fires, has enabled forest trees to become established. These facts, while they do not entirely account for the existence of prairies, are undoubtedly an important element. The prairies are particularly developed in the arid and semi-arid regions where frequent drouth has augmented the destruction occasioned by fires, and particularly on the heavier soils of that region which retain sufficient moisture to enable the grasses to form a complete covering over the soil.

Of the many grasses (popularly known as such) native to this country, or of the introduced grasses that have become established here, comparatively few are of economic importance. Their principal use is as food for live stock. Most of them grow too sparsely to be important for this purpose, and many of them are not nutritious enough to make them valuable as food. A considerable number, however, are both nutritious and palatable to stock. Yet the number of these which are propagated artificially is exceedingly small when compared with the total number of species. This is partly accounted for by the fact that a few species are surpassingly useful by reason of abundant growth, ease of propagation, nutritive value and palatability. When such a grass becomes established in a region to which it is adapted the effort to find other valuable sorts in a measure ceases. But there are vast sections of country, particularly in the cotton-producing States, and the arid and semi-arid West, where good grasses, adapted to local soil and climatic conditions, have not yet become established as field crops. Not that there are no good grasses known in these regions, for there are many of them, but it happens that these grasses are not easily propagated or have some characteristc which renders them undesirable. The well-known and valuable buffalo grass (*Bulbilis dactyloides*) of the West and Southwest is an example in point. It is one of the most nutritious and palatable of all the grasses, and produces abundant feed, but it produces very little seed, and that only on trailing, vine-like stems, from which it is impractical to harvest it. Many of the grasses which formerly constituted important factors on the ranges of the West, and which are eminently adapted to the climatic and soil conditions there, are rendered useless on cultivated lands by reason of their poor seed habits. What the breeder's art may accomplish in rendering these now useless grasses useful, by improving their seed habit, remains to be seen. The leading tame grasses of the country are as follows:

Timothy (Phleum pratense).— The acreage of this grass is the United States is twice as great as that of all other cultivated grasses put together. It may be said to be the hay grass of the country. Its supremacy is due first of all to its excellent seed habits. The seed from an acre of it will seed a larger acreage than is the case with any other grass. The seed is easily harvested, and retains its vitality for several years. It also produces relatively large yields of hay, which, although not so nutritious as the hay from some other grasses, is eaten readily by all kinds of stock. It is particularly valuable for horses, because of its favorable physiological effect on the digestive apparatus. Owners of livery stables, whose horses are liable to be subjected to hard driving after heavy feeding, will feed no other hay when timothy is available. Timothy is usually sown with wheat, in fall, at the rate of about eight pounds of seed per acre, the seed being cast on the bare ground behind the drillplows. Clover is then frequently added, at the same rate, in early spring, though farmers who raise much hay for sale prefer to omit the clover, as the pure timothy is preferred by horsemen. After the wheat crop is harvested, the grass is ordinarily used for pasture in the fall. The next season a large yield of hay is obtained (one to three or more tons per acre, according to the fertility of the soil), but the yield decreases thereafter to such an extent that the best farmers do not attempt to maintain a timothy meadow for more than two seasons, though such fields are frequently used for pasture for two or three years longer, before breaking them up for corn. In the latter case, bluegrass seed (*Poapratensis*) is frequently scattered on the timothy sod, so that the pasture consists largely of bluegrass. The production of timothy hay is confined largely to the region north of and including the eastern third of Kansas and Nebraska, and to certain restricted localities in the Rocky Mountains and Pacific Coast States; but timothy hay is used almost exclusively by horsemen in the large cities of all sections of the country.

Kentucky Bluegrass, June Grass or Bluegrass (Poa pratensis).— Next to timothy this is the most important grass in this country, though it seldom grows large enough to cut for hay. It is undoubtedly the leading pasture grass in America. Its distribution is nearly identical with that of timothy. It does not extend south of the Ohio River except in a circular area about 100 miles in diameter in Kentucky, with a point 25 miles north of Lexington as a centre; and in certain portions of Tennessee and the mountainous portions of the Southern States. In Kentucky and Tennessee its distribution is closely confined to the Cambrian rocks, which are rich in both lime and magnesia. Perhaps no other grass is so acceptable to stock as bluegrass. It is one of the most nutritious of grasses, and it is a notable fact that stock raising has never become a prominent feature of farming anywhere in the United States outside of the bluegrass region, except of course in the range country of the West, where ranching rather than farming is the prevailing form of agriculture. The best bluegrass pastures are those which are kept free from weeds and bushes, not cropped too closely and constantly, and upon which fattening stock are fed grain and mill products. Such pastures last indefinitely, but are hardly productive enough to justify their maintenance except on rough lands not well adapted to the cultivation of ordinary crops. So highly prized are the bluegrass pastures in many sections that they are seldom broken up; for it is a difficult matter to establish a good bluegrass pasture, a process requiring several years.

Millet.— The term millet is applied to three more or less distinct groups of grasses. The more common millets in this country are the foxtail millets (*Chætochloa*). They include the well-known foxtail, a common weed springing up in grain fields after harvest, and the hay-producing varieties, Hungarian grass, German millet, golden millet and a few others, all annuals which produce an abundant crop of coarse hay of rather inferior quality. They are grown mostly as catch crops, being sown in late spring and early summer on fields where other crops have failed because of drouth. They are hence confined largely to the semi-humid region extending from North Dakota to Texas. Millet hay, when fed to horses that have no other roughness, has the peculiar property of producing acute rheumatic affections of the joints; but when fed with other hay, the damage from this source is very slight. Another group of millets, frequently called broom-corn millets, are varieties of the species *Panicum miliaceum*. These are little known in this country, though they constitute important bread-producing crops in central Asia. A third kind of millet, usually known as Japanese millet, is a variety of the common barnyard grass, *Panicum crus-galli*. Some forms of this grass are common weeds all over this country. Some of the varieties produce large crops of coarse but palatable hay, particularly on wet lands in the Southern States. The seed of one variety is used for food by certain Indian tribes of the Southwest. Other varieties are similarly used in the Old World. This group of millets probably deserves more attention than it has yet received in this country.

Redtop (Agrostis alba).— This grass and its variety *vulgaris* are widely distributed in this country, occupying the whole of the timothy and bluegrass region and extending considerably farther south; but the only section in which it may be said to hold first place is in a limited area in southeastern Illinois and adjacent parts of Kentucky. In this section, practically all of the redtop seed of the country is produced. It is rather distinctly a wet-land grass, and is usually a valuable constituent of meadows and pastures on moist lands in all parts of the country except the extreme South. It is also well adapted to the acid soils of the Atlantic seaboard, where it is frequently used in meadow and pasture mixtures. In yield of hay it is distinctly inferior to timothy, but it withstands cropping and trampling by stock much better. Although quite nutritious, it is not nearly so well relished by stock as timothy or bluegrass.

Orchard Grass (Dactylis glomerata).— In its distribution in this country, this grass is identical with redtop, but it is adapted to drier soils. Particularly in the southern portion of its area, orchard grass flourishes in the shade of trees, hence its popular name. It may be said to be important as a hay grass only in that part of its range which extends beyond the limits of the timothy region. It is particularly important in the clay soils around the base of the Appalachian range from Virginia southward, though it thrives equally well throughout the timothy region. This grass produces a large yield of rather coarse hay, which, however, is of excellent quality if cut by the time the blossoming period is over. If allowed to stand longer, the quality of the hay deteriorates rapidly because of the formation of woody tissue in the stems. A rather serious objection to it is that it is inclined to grow in bunches, making a rough and uneven surface difficult to mow; yet it is undoubtedly the best of the hay grasses in those portions of its region where timothy does not succeed. It is also an excellent pasture grass, withstanding much hard usage, and furnishing large quantities of herbage. In New Zealand, where this grass is very popular, and in England, it is known as cock's-foot, from the fancied resemblance of its branching seed-head to a chicken's foot.

Bermuda (Cynodon dactylon).— With some reservations, it may be stated that what bluegrass is to the North, Bermuda is to the South. The differences are: Bermuda revels in the heat of summer, while bluegrass makes little growth in hot, dry weather. It stands drouth much better than bluegrass. On good land, Bermuda furnishes good crops of hay, which bluegrass does not. Bermuda stands trampling even better than bluegrass, and yields more pasture. On the other hand, Bermuda furnishes pasture only during the warm season; and while it furnishes larger amounts of feed than bluegrass, stock do not relish it quite so well. The seed of Bermuda is also quite unreliable and very high-priced, so that, to ensure getting a stand of it, it is the usual custom to plant small pieces of sod, which soon spread over the ground and form a complete covering. One of the most characteristic features of Bermuda is its habit of sending out long runners which run along the surface of the ground, taking root at the joints. This renders it a matter of considerable difficulty to eradicate the grass when it is once established. But this may be done by growing densely shading crops, such as oats in winter, followed by cowpeas or velvet beans in summer, for one or two seasons. A single season of clean culture, such as cotton receives, will then completely destroy the Bermuda. It may also be destroyed by plowing very shallow in midsummer, followed by sufficient harrowing to prevent further growth before winter. *Saint Lucie Grass* is a variety of Bermuda which is found in Florida and near the Gulf Coast. It grows considerably larger than the species, and in said to remain green longer in the fall.

Johnson Grass or Means Grass (Sorghum halapensis).— This grass was introduced into South Carolina from Turkey near the middle of the last century. In that State it is generally known as Means grass, from Governor Means, who did much to popularize it. It was later taken to Mississippi by a Mr. Johnson, where it became widely known under his name. The most prominent characteristic of Johnson grass is its habit of producing an enormous growth of underground stems (rootstocks, or rhizomes), from each joint of which a new plant may be produced. It is therefore a matter of extreme difficulty to get rid of the grass when it is once established. It is now very generally distributed over the cotton-producing States, and is the most formidable weed found in the South. It is generally believed that it cannot be exterminated by any practicable means. This, however, is not the case. The rootstocks, which make this plant a formidable weed, begin to be formed just as the plant blossoms. If the grass be cut for hay at this time, its energies are then diverted to making growth above ground, the growth of the rootstocks being checked. A second crop of hay may be cut when the plants blossom again. Immediately thereafter the land should be plowed very shallow, and then harrowed frequently to prevent further growth till winter. The rootstocks formed the previous year will not survive a second winter, so that land treated as above described will be free from Johnson grass the next year.

While Johnson grass produces rootstocks in abundance, it spreads very slowly by this means, but spreads rapidly by seed. These are produced in great quantity, are readily eaten by stock and are thus carried over all parts of a farm on which it has once gained a foothold. Johnson grass usually gives three cuttings of hay in a season, of about a ton each on good land. The hay is of excellent quality, particularly for cattle and for all horses except livery horses liable to be subjected to hard driving after a full feed. In such cases its laxative and diuretic effect becomes objectionable. As a pasture grass it cannot be compared with Bermuda, though it is greatly relished by all kinds of stock. It is soon killed down completely when heavily pastured, but when the land is plowed it springs up again.

Sudan Grass.— This is closely related to Johnson grass, which it resembles in all respects except two. It is an annual and it has no rootstocks. It has recently been introduced into this country from Africa, and is becoming an important hay grass in localities where better grasses are wanting.

Brome Grass (Bromus inermis).— This is a recent introduction from east central Europe, and on the prairie soils of the Northwest and the Pacific Northwest it occupies the place that bluegrass holds on the glacial drift of the more humid climate to the East. It is much larger than bluegrass, and hence furnishes more feed. It is much relished by all classes of stock. Stock eat with great avidity the straw from which seed is harvested, and the hay, cut just after the blossoms fall, is of excellent quality. Brome grass forms an excellent sod.

Italian Rye Grass (Lolium italicum).— This is perhaps the most important of all the meadow grasses in England and on the continent of Europe. It is relished by stock better perhaps than any other of the cultivated grasses; yet, for some reason not entirely clear, it is almost unknown in America. The only section of the country in which it has gained favor is in northwestern California, western Oregon and western Washington. It is adapted to a very wide range of soils. It thrives remarkably on land reclaimed from salt marshes by dyking, and it is also a valuable grass on upland soils that are inclined to be dry. Practically speaking, it is an annual, but if properly managed it reseeds itself in such a manner as to be practically a perennial. It is a valuable constituent of all pasture mixtures, and is a hay grass of much value. It is not well adapted to single culture, being rather too weak of stem to stand alone.

English Rye Grass (Lolium perenne).— This differs from the last in no essential respect except that it does not grow quite so tall, and is slightly more inclined to a perennial habit. It is an important European grass practically unknown in America.

Tall Fescue and Meadow Fescue (Festuca elatior and variety **pratensis).**— These two grasses differ in no essential particular (from the agriculturist's standpoint) except that the first is taller and more leafy than the second, and therefore more valuable as a forage plant. The smaller form is frequently known as English bluegrass, a name which has led to much confusion, and which should be abandoned. It is not closely related to our Kentucky bluegrass, nor to Canadian bluegrass (*Poa compressa*). Tall fescue is much confused with meadow fescue by seedsmen, and it not infrequently occurs that seed of the latter is sold under the name of tall fescue. This fact has hindered the recognition of the decided merits of tall fescue. Next to Italian and English rye grass, these two grasses are the most important cultivated grasses in Europe. But like the rye grasses, they have never been recognized as valuable grasses in this country except in a few restricted localities. One of these localities is western Missouri and eastern Kansas.

Tall Oat Grass (Arrhenatherum avenaceum).— This grass is found occasionally in all parts of the country, but is nowhere an important crop. Stock do not eat it readily at first, but soon become accustomed to it, and then eat it freely. It has considerable value both for hay and for pasture. Its seed drops promptly when ripe, and is thus very difficult to save.

Cheat, or Chess (Bromus secalinus).— In the Central and Eastern States, cheat is a pernicious weed in wheat fields, and it is popularly believed that, under certain unknown conditions, wheat turns into cheat, and it avails nothing that the fallacy of this notion has been demonstrated time and time again. In some parts of the South, and in the Willamette Valley in Oregon, cheat is sometimes grown for hay. It produces a large yield of rather poor hay. Being an annual, it is of little value for pasture.

Velvet Grass (Holcus lanatus).— This grass is common in the Pacific Coast region along roadsides and in waste places. On sandy soils along the coast and on peaty soils that dry out in summer, velvet grass is perhaps the most profitable hay and pasture grass, because the better grasses do not succeed. Stock usually refuse to eat it until driven by hunger, but they will soon acquire a taste for it, and it is exceedingly nutritious. Its worst faults are its low yield and lack of palatability.

Canadian Bluegrass (Poa compressa).— A grass of small economic value, found quite generally over the Northern States and in Canada. It is of some value as a sand binder, and, when kept closely mowed, it forms a smooth, even sod in lawns. In parts of Virginia and States to the north it is valued as a pasture grass on sandy loam soils.

Crab Grass (Panicum sanguinale).— This is not, strictly speaking, a cultivated grass. It springs up in cornfields, and after small grain crops in late summer, and frequently furnishes a considerable crop of hay, which is of fair quality. It is universal in the South and extends northward to the Missouri and Ohio rivers.

Fodder Grasses.— Under this term we may include the coarse-growing grasses such as the sorghums, Kafir corn, Milo maize, teosinte, etc. On account of their large size, they require to be handled in a different manner from the common hay grasses. They are usually cut and shocked after the manner of fodder corn, though most of them may be handled by haying machinery if they are sown quite thick.

The sorghums (saccharine sorghums) were introduced into this country about the middle of the last century, and were extensively grown for syrup making before the now universal adulteration of this class of food materials destroyed the market for all farm-made syrups. At present little sorghum syrup is produced, but the sorghum plant is much grown for fodder. Its most valuable characteristic is its ability to withstand protracted drouth. It is therefore especially adapted to the western edge of the humid region, where it is exceedingly popular. Sorghum is also very generally grown in all the Southern States, where the fodder is particularly valuable as a feed for the plantation mules. In all the cotton-growing States, as well as along the edge of the great plains, sorghum is a much more certain crop than corn (maize). Kansas is the leading State in the production of this crop. Some varieties are grown as far north as Minnesota and North Dakota. In the South two or three cuttings may be made in a season.

Several varieties of Kafir corn (non-saccharine sorghums) have become established in this country in recent years. The plant resembles a low-growing, branching, very leafy sorghum. It is cultivated either for fodder or for grain, of which latter it yields abundant crops. The grain is inferior to corn, but its more certain yield in dry seasons renders it a valuable crop in the same sections where sorghum is grown. It is rather more distinctly a southern crop than sorghum, being grown most largely in Kansas, Oklahoma, Texas and New Mexico. Milo maize is not very widely known in this country, but it is gaining a foothold in parts of Texas, where it is grown after the manner of sorghum and is said to furnish large crops of valuable fodder or hay. Teosinte (*Euchlenea mexicana*) is a tropical plant somewhat resembling sorghum, but in reality more closely related to corn (maize). It does not produce seed in this country, but on rich alluvial soils in the Southern States it produces enormous yields of green fodder much relished by cattle. It is of no account on poor thin soils. Near the cities, where dairying is an important industry, this crop is of great value in the South. It may be cut several times in a season, and there is no waste in feeding it, as the stalks are readily eaten.

Pearl millet may be classed with the sorghums on account of its manner of growth, but botanically it is quite different from them. It is a native of Africa, and was introduced in this country about 30 years ago. It has been tried very generally over the country, but has never gained favor. The seed is frequently unreliable, and the stems are inclined to be woody when approaching maturity.

A large number of our wild grasses have more or less economic importance. In fact, a majority of them furnish food for domesticated animals, while some are important for other reasons, as will appear in the discussion below. Only a few, however, are of sufficient importance to warrant their mention here. It is somewhat remarkable that none of our wild grasses have been domesticated during the past hundred years. This is perhaps due to the fact that the best of them were brought into cultivation very early in the history of the country. The more important genera of our wild grasses are:

Andropogon.— This genus is particularly well developed along the eastern edge of the Western plains, where several species form important constituents of the immense acreage of wild hay cut in that region; also in the Southern States, where it constitutes the major part of the growth of grasses in open woods and abandoned fields. *A. virginicus* is one of the most abundant grasses from Maryland southward. These grasses are large and coarse, and are not much relished by stock except in the early stage of their growth, whence the common practise of burning over the prairies to start a new growth of tender grass.

Agropyron.— This genus is particularly characteristic of the northern Rocky Mountain States, where several species are valuable for forage. They are, as a rule, better relished by stock than the preceding, and some of them furnish hay of excellent quality. *A. occidentale* is the well-known blue-stem of the mountain regions and the western margin of the plains. It has strongly creeping rootstocks and is perhaps the best hay grass among the wild species in the region where it grows. There is reason to believe that it will in time constitute an important crop on cultivated lands, particularly in the moister valleys of the northern portion of the arid region. *A. divergens* is the common bunch grass of eastern Washington and Oregon and northern Idaho. It is valuable on the ranges and furnishes very good hay where the rainfall is 20 inches or more. *A. repens* is the well-known quack grass of our Northern States. On account of its great development of rootstocks it is a very pernicious weed. Yet it furnishes fairly good forage and is recommended by some for cultivation in the semi-arid region. It also has some value as a sand binder. It may be eradicated by methods similar to those described under Johnson grass. *A. tenerum,* the slender wheat-grass of the Northwestern prairies, is a good hay grass, seed of which may now be had on the markets.

Ammophia.—A genus of one species, known as beach grass; in Australia and South Africa called «marram.» This is as yet the only species of grass that has been used successfully in northern latitudes as a sand-binding grass on dunes near the coast. For this purpose it is invaluable. Extensive plantations of it have been made on both the Atlantic and Pacific coasts; also on dunes near the Great Lakes. It is propagated by digging up bunches of the grass, separating each one into several small bunches and then resetting them in the sand.

Arundinaria.— The cane of the Southern cane-brakes, a relative of the Oriental bamboos. It is much utilized as winter forage for cattle, which frequently winter in good condition in the brakes. There are two closely related species, the larger one furnishing the common cane fishing rods.

Avena.—*A. fatua,* the wild oats of the spring-wheat producing States, is a weed in wheat fields. In several States the common hay is cut from patches in wheat fields taken by wild oats. If cut early enough the hay is of fair quality. Wild oats form an important constituent of the forage on the ranges of portions of the State of California.

Bouteloua.— This is one of the most characteristic genera of the arid regions of America, particularly in the Southwest. Side oats grama (*B. curtipendula*) is a handsome and valuable grass on the plains, where it furnishes much valuable feed. Blue grama (*B. oligostachya*) is the buffalo grass of the plains of eastern Montana, and is also a valuable forage plant.

Bulbilis.— Buffalo grass (*B. dactyloides*) is probably the most valuable wild grass of the plains region, extending from the Dakotas and Montana to southern Texas and New Mexico. It is one of the most nutritious grasses, rivaling Kentucky bluegrass in this respect, but is less productive than the latter. In Texas and elsewhere there were formerly vast areas of buffalo grass forming a compact sod; but owing to overstocking and the depredations of prairie dogs, the grass is now much less in evidence. It is not well adapted to use on cultivated land because of its poor seed habits.

Calamagrostis.—An important genus along the northern border of the United States. Blue-joint (*C. canadensis*) is an important constituent of swamp hay, of which a large acreage is cut in Minnesota, Iowa and adjacent States.

Cenchrus.— Two species of *Cenchrus* are found in sandy soils in the South and West. They are noted for the hard spiny «burs» in which the seed are found. They are known as «sand burs,» and are pernicious weeds in sandy soils.

Setaria (Chætochloa).—The foxtail grasses. Two species, the yellow foxtail and green foxtail, are useless weeds which spring up in wheat fields after harvest.

Distichlis.— Salt grass (*D. spicata*) is common in salt water marshes on the coasts and on alkali soils in the arid regions. It has some value as a forage plant.

Elymus.— This is a large and important genus. Several representatives are widely distributed and some possess considerable value as forage plants. *E. condensatus* (giant rye-grass) is a very characteristic grass in lowlands in the arid regions, where it grows in large clumps, attaining a height of six or seven feet. While not greatly relished by stock, it frequently suffices to sustain life during periods when other grasses are covered by snow. It has been sown on cultivated land in some irrigated lands of the West, particularly where alkali has begun to appear, and it furnishes large crops of hay. This hay is rather too laxative for horses, but is said to make good feed for cattle. *E. triticoides* (wild wheat) is found in great abundance on wet meadows in eastern Oregon and adjacent regions, where it is frequently cut for hay. The forage is said to be excellent. *E. canadensis* is a very variable species, common throughout the Central and Northern States. Some forms of it are characterized by strongly developed rootstocks and thrive in the sandiest soils. It probably has considerable value for holding embankments in places where the soil is sandy. It is also a good forage grass and is worth more attention than it has yet received for this purpose in the semi-arid region.

Festuca.— One of the characteristic genera of the Western States. *F. ovina* (sheep's fescue) is one of the most abundant and most valuable grasses of the ranges in the mountain regions.

Hordeum.— Squirrel-tail grass (*H. jubatum*) is common on the plains of the West, particularly in the north. When young and tender it is eaten by stock. When mature, its rough beards are often injurious to stock; they penetrate into wounds in the mucous membrane of the mouth and into crevices in broken teeth and often cause the death of horses and cattle. *H. murinum,* a species found on the Pacific Coast, has barbed beards which penetrate the skin of young animals. It is most pernicious pest.

Muhlenbergia.— A genus particularly well developed in the South, where several species of it are usually found in moist or shady places. Nimble Will (*M. diffusa*) is one of the commonest species. A genus of no particular value.

Panicularia.— Four species of *Panicularia* are common swamp grasses of the Northern States. They are all excellent forage grasses, but are little utilized, since they seldom grow in situations that permit them to be harvested.

Panicum.— One of the largest and most important genera of grasses in the United States, particularly prominent in the Southern States. Several species have already been noticed in the list of tame grasses above. These are crab grass, Colorado grass, Japanese millet and the broom-corn millets. The most prominent remaining species are: *P. amarum*, a grass with long creeping stems, common on sands near the coast from Connecticut to Florida and along the Gulf Coast. This species is of considerable value for holding drifting sands. *P. capillare,* Old Witch grass, tickle grass, an annual with widely branching panicles, common and sometimes troublesome as a weed in cultivated ground. *P. maximum,* Guinea grass, introduced into Florida from the tropics. A valuable fodder plant, furnishing several cuttings in a season, sometimes confused with Johnson grass, but much less hardy. *P. proliferum,* sprouting crab grass, growing in much the same region as crab grass, but extending farther northward. It springs up in cultivated fields in late summer and is occasionally utilized as pasture or hay. *P. virgatum,* switch grass, ranging from Maine to the Gulf and westward to the Rocky Mountains. It is a perennial, three to five feet high, and, if cut very early, furnishes a large yield of fairly good hay. It deserves attention as a hay and pasture grass in semi-arid regions.

Paspalum.—Another large and important genus. Seeds usually in digitate spikes resembling those of crab grass. Carpet grass (*P. compressum*) is a valuable pasture grass near the Gulf Coast, particularly on sandy soils. On such soils it will even drive out Bermuda when closely pastured. Its spreading stems form a dense carpet-like growth which gives it its popular name of "carpet grass." Water grass (*P. dilatatum*) is another common grass in all the Southern States, frequently found in wet lands. Its seed has recently been placed on the market and it is used to some extent as a hay and pasture grass. Knot grass (*P. distichum*), with creeping stems, is also common in the South, where it is frequently mistaken for Bermuda, which it closely resembles. Said to be valuable on wet lands as pasture.

Phalaris.— One of the species of this genus (*P. arundinacea*), known as "reed canary" grass, is one of the most thoroughly cosmopolitan species in this country. It is found all over the country, usually on wet or overflowed land, but frequently on uplands as well. It is a perennial with creeping rootstocks (underground stems) growing four to six feet high. Few grasses are better relished by stock, either as hay or as pasture; and, were it not for its habit of shedding its seeds the moment they are mature, it would undoubtedly have become an important cultivated grass long ago. *P. canariensis* is the well-known canary grass, seed of which is commonly used as food for canary birds.

Poa.— This is one of the most characteristic genera of this country, some representatives of it being well-nigh universal, except in the far South. Kentucky bluegrass, the June grass of the Northern States, one of the most important grasses in America, has been fully discussed under the tame grasses above. Many varieties of this species are found in the wild state in the Northwest, where it is of great importance as a range grass. Even in the region of its greatest importance it is a semi-wild plant, springing up everywhere from seed scattered by the wind or by stock. It is the finest pasture grass in the world, but not the most productive. *P. annua* is another representative of the genus found all over the country. It is particularly common in the South and on the Pacific Coast, where it remains green during the entire winter. This species is not native here, but is fast becoming one of our commonest grasses. It is frequently found in lawns and in cultivated grounds. It seldom attains a height of more than a few inches. Texas bluegrass (*P. arachnifera*) is noted for the cottony appearance of its seed. It is also a valuable grass for winter pasture in the South, but is somewhat difficult to establish in a pasture. Like Bermuda, it is usually propagated by setting small pieces of the sod a foot or two apart each way. It is a native of Texas, but is nowhere very abundant. Many species of Poa are found in the far Northwest, where they are important range grasses. *P. lævigata* is frequently cut for hay on wet meadows in the mountain regions of Oregon and Washington.

Savastana.— Vanilla grass (*S. odorata*), commonly called "sweet grass" in the Northwest is found from New England to Oregon and Washington. It is noted for its strong vanilla-like odor, resembling the odor of sweet vernal grass. The dried leaves are used by the Indians in weaving small mats and boxes, in which condition they retain their characteristic odor.

Spartina.— Cord grass (*S. cynosuroides*) is an important constitutent of the swamp hay of which large quantities are cut in Minnesota, Wisconsin and Iowa. It is frequently found in large areas growing alone, as if it had been sown there by hand. The hay is of fair quality and the yield large.

Sporobolus.—Another characteristic genus of the West and Southwest, where several species are important on the ranges. Saccaton (*S. wrightii*) is common in Arizona and New Mexico, where it grows in large clumps and is frequently cut for hay. Although decidedly coarse, the hay is valued as forage. Dropseed (*S. cryptandrus*), common on the Western plains and in the Rocky Mountains, is much relished by stock.

Stenotaphrum.—A single species, *S. dimidiatum,* is of importance. It is frequently used as a lawn grass from Charleston, S. C., southward. Sometimes called Charleston lawn grass and Mission grass. This is the pimento grass of Jamaica. In New South Wales it is called buffalo grass. It grows on all kinds of soils, from heavy clay to almost pure sand, but is seldom found far from the seashore.

Stipa.—A large and important genus in our western flora. Several species are remarkably long-awned on the flowering glumes, giving them the popular designation of needle grasses. Some of them have the lower end of the seed produced into a hard, sharp joint which frequently penetrates the skin of animals, rendering these species somewhat of a nuisance to stockmen. Many of them, however, make excellent hay on the great plains. *S. leucotricha* is the bearded mesquite of central and southern Texas, a valuable wild hay grass. *S. vaseyi*, found in the Rocky Mountains at altitudes of 5,000 to 6,000 feet, has the peculiar property of inducing sleep in stock that eat it, for which reason it is known as «sleepy grass.» No harm, further than a desire to sleep, seems to follow a feast on this grass; the effects wear off gradually in a day or two.

Uniola.— One species (*U. latifolia*) has large panicles of broad, drooping spikelets, rendering it exceedingly graceful. It is used as an ornamental, and is indeed one of the most beautiful of the grasses. It is found from Pennsylvania westward to Illinois and southward. *U. paniculata*, seaside oats, grows abundantly on the sands of our southern Atlantic coast and on the Gulf coast where it serves as a sand binder.

Zizania.— Wild rice; Tuscarora rice. Wild rice (*Z. aquatica*) is one of the most striking in appearance of any of the American grasses. It occurs on mud flats almost all over the country. It is very abundant on the tide flats of the Delaware and Potomac rivers, as well as in many other places, both in the United States and Canada. A field of it in bloom presents a very pleasing appearance with its large, graceful panicles, yellow below with a great wealth of staminate flowers in drooping branches of the panicle, the upper, pistillate branches rising gracefully at various angles. When found in situations that permit it to be harvested, Indian rice is cut for forage, yielding enormous quantities of succulent feed, much relished by stock. The seed is gathered in quantity for food by Indians in the Northern States and in Canada. It is frequently planted in mud or shallow water for its seed, of which fish and birds are exceedingly fond. The seed is gathered in boats, into which it is threshed from the tall stems growing in water. The seed keeps best under water.

Ornamental Grasses.—A number of valuable ornamental grasses have been mentioned above. A few others deserve notice. Reed (*Arundo donax*) is found in dooryards in nearly all parts of the country, particularly in the South, though it thrives quite well at the North. It frequently attains a height of 15 feet or more. It resembles sorghum, but is more leafy and more graceful in appearance. It is a perennial, springing up in early spring from the roots. As a background for smaller ornamental plants it is invaluable. Many of the bamboos are exceedingly useful as ornamental plants. Only a few species are adapted to northern latitudes. A garden variety of *Phalaris arundinacea* is common in this country under the name of ribbon grass. Its leaves are striped with white. There is also a similar striped variety of reed. *Coix lachryma-jobi*, Job's tears, is a small to medium-sized grass frequently found in gardens and dooryards; it is noted for the indurated, tear-shaped covering of the seed. *Eulalia japonica* of the Orient, *Erianthus ravennæ* (Ravenna grass) of Italy and *Gynerium argenteum* (Pampas grass) of the Argentine pampas are other well-known and deservedly popular ornamental grasses.

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GRASSHOPPER-FROG, or CRICKET-FROG, a small, agile, noisy frog (*Acris gryllus*), common throughout the warmer half of the United States, whose spring cry is like the rattling produced by striking rapidly two resonant pebbles. It is about an inch long, brown with a blackish triangular patch on the back of the head and a dorsal stripe. Its eggs are attached in little masses to a blade of marsh-grass.

GRASSHOPPERS AND LOCUST-PLAGUES. Insects of comparatively large size of the orthopterous families *Acridiidæ* and *Locustidæ*, or short-horned and long-horned grasshoppers respectively. In Great Britain and her colonies the former are the «locusts» of popular speech and only the *Locustidæ* are called «grasshoppers.» (For the allied family of crickets, see GRYLLIDÆ). The *Acridiidæ* have the antennæ shorter than the body and blunt, the ovipositor short and its parts divergent at the tip and the sound-producing organs (see ORTHOPTERA) on the hind thighs and outer edge of the forewings. In the *Locustidæ* the antennæ are long and tapering, the ovipositor long and sword-like and the sound-organs are at the inner base of the forewings. This latter family embraces the katydids, tree-crickets, green meadow-grasshoppers and certain Western species erroneously called «crickets» and the group is more particularly treated under KATYDID. In both families the hinder legs are greatly enlarged, enabling the insects to make the long leaps so characteristic of them; their wings are also capable of carrying them in some cases many hundreds of miles.

The short-horned grasshoppers are those of greatest interest economically and those responsible for the «locust» plagues of Africa, Arabia and southern Asia, as also in our West. From time to time vast bodies of certain species sweep from one region to another in swarms many square miles in area and so dense as to darken the sun, feeding on grasses and herbage and consuming not only crops and pasturage as if by fire, but stripping bushes and trees of foliage and even of the bark. In the ancient world such visitations, which frequently extended into central Europe, caused extensive local famines, sometimes resulting in the loss of hundreds of thousands of human beings and vast numbers of grazing animals. Such «plagues» lasted for two or three years, the hosts breeding numerously at first, but gradually dying out and ceasing to reproduce outside the limits of their permanent breeding-grounds. The reproduction of grasshoppers consists in the deposit in autumn of eggs laid in bunches, covered with a secretion which hardens into a case or «pod,» beneath the surface of the ground, into which the ovipositor is deeply thrust and where the eggs remain to be hatched the following spring; in warm countries, however, two generations may take place annually. The locusts referred to in Scripture belonged probably to the species now named *Schistocerca peregrina*, of North Africa and Arabia. The swarms which from time to time appear in South Africa are of *Pachytylus migratoroides*; while *P. migratorius* is the best-known one of southern Europe and Asia. Similar species inhabit the open interior regions of both North and South America, a species of *Acridium* afflicting Argentina.

Of the many species in the United States those of the genus *Melanoplus* are of greatest interest because frequently destructive of crops. The most conspicuous is *M. spretus*, the Rocky Mountain locust, which has been a scourge of agriculture west of the Mississippi River ever since settlements began there. Among the more recent great plagues were those of 1856 and 1874, the latter enduring three years and causing widespread ruin throughout the whole region between the Mississippi River and the Rocky Mountains. The Federal government appointed a commission of entomologists to investigate the habits of the insect and its three 'Reports' (1877, 1879 and 1882) are exhaustive essays on the subject. It was found that these and other destructive locusts bred throughout the whole plains region in the river bottoms and sunny depressions and that little could be hoped for in défense except the gradual effect of cultivation in destroying the eggs and young by late and early plowing. This effect has been gained with unexpected celerity; and troublesome grasshoppers now breed in considerable numbers only in northern Idaho and central British Columbia. Swarms occasionally migrate and do damage, but the extensive plagues of the past will probably not recur. Nevertheless, grasshoppers are likely often to be locally harmful in the West and must be combated intelligently. The most valuable preventives are the burning over or deep plowing of breeding grounds, so as to turn the eggs out and kill them in the fall or before they can hatch in the spring. The grasshoppers themselves may be captured by means of «hopper-dozers» or kerosene pans. A cheap destroyer consisting of one part of Paris green thoroughly mixed in 60 parts of fresh horse-dung, two pounds of salt to half a barrel of the mixture being added, after being dissolved in water. This mixture is scattered broadcast along the edges of crops where infestation is feared and the locusts, liking and eating the poison, die a few days later. The ordinary bran-arsenic mixture for cut-worms may also be used and in some regions wheat fields are protected by a trap-crop of rye sown in a strip around the fields and poisoned by spraying with Paris green.

Bibliography.— Sharp, 'Insects' (Vol. VI, Cambridge Natural History 1900); Howard, 'The Insect Book' (1901); Hyatt and Arms, 'Insecta' (Boston 1890); Kellogg, 'American Insects' (New York 1908); Fabre, J. Henri, 'The Life of the Grasshopper' (1916), and publications of the United States Department of Agriculture, especially Bulletin 25, Division of Entomology.

GRASSQUITS, a group of interesting little seed-eating finches of the West Indies, belonging mainly to the genus *Sporophila*, and flocking in grassy lands and pasturage.

GRATIAN, or GRATIANUS FRANCISCUS, Benedictine writer of the 12th century. He was a native of Chiusi and is considered the founder of the science of canon law. He was the author of a famous work entitled 'Decretum; or Concordia discordantium Canonium,' in which he endeavors to reconcile those canons that seem to contradict each other. It is a rich storehouse of the canon law of the Middle Ages. The best edition of the text is found in the 'Corpus Juris Canonici' of Richter (1833-39).

GRATIAN, or GRATIANUS, grā-shĭ-ā'nŭs, Roman emperor, eldest son of the Emperor Valentinian: b. Sirmium, Pannonia, 359 A.D.; d. Lyons 383. When only eight he was raised by his father to the rank of Augustus. On the death of Valentinian in 375 the eastern part of the empire still remained subject to Valens and Gratian was obliged to share the western part with a half-brother, a child of four years, associated with him under the title of Valentinian II. In the early part of his reign the Goths and Alemanni made incursions into the Danubian provinces and into Gaul. They were repeatedly defeated by Gratian and his generals, but they also advanced into the Eastern empire and defeated and killed Valens in 378. Gratian then bestowed the Eastern empire upon Theodosius, one of his generals.

GRATIOLA, grā-tī'ō-lą, a genus of scrophulariaceous plants with many species widely distributed in temperate regions. A notable representative is the European hedge-hyssop (*Gratiola officinalis*), which is extremely bitter, acts violently as a purgative, diuretic and emetic and in overdoses is an acrid poison. It was formerly highly esteemed as a medicine, and its virtues were supposed to depend on a bitter resinous principle called «gratiolin.» Several species are natives of North America.

GRATTAN, Henry, Irish orator and statesman: b. Dublin, 3 July 1746; d. London, 4 June 1820. He was called to the Irish bar in 1772, and in 1775 was elected member for Charlemont in the Parliament of Ireland. He immediately became distinguished in the opposition, and infused that spirit into the country which produced in 1782 a repeal of the statute of the 6th George I, which had enacted that the crown of Ireland was inseparably connected with that of Great Britain; that Ireland was bound by British acts of Parliament when named therein; that the Irish House of Lords had no jurisdiction in matters of appeal; and that the last resort in all cases of law and equity was the British House of Lords. For his share in the acquirement of this concession the Irish Parliament voted him £50,000 to be laid out in the purchase of a house and lands for him and his heirs forever. He became the leader of the country party in the House of Commons and the head of the Irish Whigs. Disgusted by the Irish Rebellion and its manifold horrors, he temporarily withdrew from Parliament, but the project of a union being brought forward by Pitt, he once more obtained a seat in Parliament for the purpose of opposing it. When it was carried, however, he did not refuse a seat in the United House of Commons, being returned in 1805 for Malton in Yorkshire, and in the following year for Dublin. His later years were chiefly occupied in a warm and energetic support of Catholic emancipation. Grattan was the zealous friend of Ireland from first to last. As a public speaker he had to contend with a defective voice; but his eloquence was bold and commanding, combining strength with beauty and energy and elevation with elegance. The best collection of Grattan's parliamentary speeches is that edited in 1822 by his son Henry, who also wrote an account of his 'Life and Times' (1839-46). Consult Lecky, 'Leaders of Public Opinion in Ireland' (1871); Mc-

Carthy, ‘Henry Grattan’ (1886); Dunlop, ‘Henry Grattan’ (1889).

GRATTAN-FLOOD, William H., Irish organist and author: b. Lismore, 1 Nov. 1859. He was educated at Mount Melleray, All Hallows College, Dublin, Carlow College and the Catholic University of Ireland. He has been at various times theological student, tutor, professor of music and languages and lecturer on Irish history. He was professor of music at the colleges of Tullabeg and Clongowes Wood, served as organist in various Irish churches and since 1895 has been organist and choirmaster at the cathedral of Enniscorthy. He was lecturer at the Mangan and Balfe centenaries in 1903 and 1908 respectively and was president of the music section of the Pan-Celtic Congress held at Brussels in 1910. He was historical witness at the process for beatification of the Venerable Oliver Plunkett, archbishop of Armagh. He is a member of the Royal Society of Antiquaries of Ireland and of the International Musical Society. His published works include ‘History of Irish Music’; ‘Story of the Harp’; ‘Story of the Bagpipe’; ‘Memoir of W. Vincent Wallace’; ‘Memoir of Father James Dixon.’ He edited ‘Moore's Melodies’; ‘Spirit of the Nation’; ‘The Armagh Hymnal’ and was joint editor of ‘De Annatis Hiberniæ’; ‘The Papal Registers’ and collaborated in Grove's ‘Dictionary of Music,’ ‘Dictionary of National Biography’; ‘The Catholic Encyclopedia,’ etc.

GRATZ, Rebecca, American educator: b. Philadelphia, 4 March 1782; d. Philadelphia, 27 Aug. 1869. Of a family noted for wealth and culture, she showed her bent of mind by founding in 1838 in Philadelphia the Hebrew Sunday-school, the oldest society of its kind in America, and for 32 years she was at its head. Apart from her labors in behalf of the Jewish poor and needy, she was quick to respond to the claims of charity without regard for creed, and she was long regarded as Philadelphia's representative Jewess for her simple piety, personal charm and social standing. Her name will always be associated with Scott's ‘Ivanhoe,’ for once when Washington Irving was visiting Sir Walter Scott and learned that a Jewess was to be introduced in the latter's novel, then in course of preparation, the American described Rebecca Gratz with so much warmth — that Scott was deeply impressed. When ‘Ivanhoe’ was finished he sent the first copy to Irving with the inquiry whether the «Rebecca» of the romance compared favorably with the real Rebecca.

GRATZ COLLEGE, Philadelphia, a Jewish institution of higher learning, founded under a deed of trust by Hyman Gratz (1856), vested in the Congregation Mickveh Israel of Philadelphia. It is devoted to the dissemination of Hebrew culture and religion and is, in effect, a Jewish teachers' college.

GRAU, grow, **Maurice,** American operatic manager: b. Brünn, Austria, 1849; d. Paris, France, 14 March 1907. He came to the United States with his parents in 1854; was graduated from the New York College in 1867, and from Columbia Law School. From 1872 until 1903 he was the most prominent operatic manager in America, securing a long line of singers, musicians and actors, including names so diverse as Aimée, Rubinstein, Salvini, Sarah Bernhardt, Patti, Irving, Coquelin, Jane Hading, Mounet-Sully, Mme. Rejane. As director of the Maurice Grau Opera Company, he brought some of the most famous singers of the day to America. He was manager of the Metropolitan Opera House, New York, from 1891 to 1903.

GRAU, Miguel, Spanish-American admiral: b. Piura, Peru, 1834; d. 1879. After studying in the naval school at Callao he entered the Peruvian navy as a midshipman in 1852. In 1871 he was put in command of the turret ship *Huascar,* and in the Chilean war of 1879 was killed by the explosion of a shell while engaged with two ironclads of the enemy.

GRAUBÜNDEN. See Grisons.

GRAVATT, William Loyall, American Protestant Episcopal bishop: b. Port Royal, Va., 15 Dec. 1858. He was educated at Virginia State College and Virginia Theological Seminary. Deacon's orders were conferred upon him in 1884 and he was advanced to the priesthood in 1885. He was assistant rector of Saint Paul's, Richmond, Va., 1885–87; and rector of Saint Peter's, Norfolk, Va., 1887–93, and Zion Church, Charlestown, W. Va., 1893–99. In 1899 he was consecrated bishop of western Virginia.

GRAVE CREEK MOUND. Set Mound Builders and Mounds.

GRAVEL. See Calculus.

GRAVELOTTE, gräv'lŏt, **Battle of,** one of the most severely contested and most important conflicts of the Franco-German War (q.v.). It is named after a village of Lorraine, seven miles west of Metz, but is also called by the French the battle of Saint Privat, and of Gravelotte and Rezonville. After the disastrous defeats at Wörth and at Forbach on 6 Aug. 1870 the French in two armies, one under MacMahon and one under Bazaine, retreated along the line of the Moselle, their object being to join forces at Châlons. To prevent this the first German army under Prince Frederick Charles intercepted Bazaine by a circuitous march, forced upon him the battle of Courcelles and Mars-la-Tour and compelled him to keep within touch of Metz. On 18 August the armies of Prince Frederick Charles and Steinmetz, numbering about 211,000 troops under the command of King William, attacked the position. Bazaine had taken a very strong position with about 111,000 men around Gravelotte on a ridge of hills to the west of Metz, and fronting westward. His line extended from Rancourt and Saint Privat on the north through Amanvillers and Chatel to Rozerieulles. The Germans were not well informed as to the exact position of the French, believing the latter's right to be at Amanvillers, whereas it extended fully three miles further north to Rancourt. A flanking movement against the French right was determined on by the Germans, joined with a frontal attack on the left and centre. The flanking movement was delayed because the French right was three miles further north than had been expected and the frontal attacks, which were launched at noon about Vernéville, were checked. A cavalry charge by the Germans was also repulsed. The Germans carried the heights of Moscon, Saint-Hubert and Point-du-Jour during the afternoon, but the battle was undecided until about 7 o'oclock, when the flanking movement on the French right was finally carried out. The Prussian Guards and Saxon troops took Saint Privat and drove the French right from its position, while the French centre and left were checked from breaking through at Gravelotte. The Germans lost over 28,000 men and the French over 12,000; the latter were forced to retreat into Metz, which was immediately invested by Prince Frederick Charles, and capitulated two months later on 27 October. Consult Bleibtren, C., 'Die Schlachten um Metz' (Metz 1910), and Erb, F. E. H., 'L'Artillerie dans les batailles de Metz, 14–18 août' (Paris 1906).

GRAVES, Anson Rogers, American Protestant bishop: b. Wells, Rutland, Vt., 13 April 1842. He was graduated at Hobart College 1866. He was ordained priest in 1871, and was assistant in Grace Church, Brooklyn, 1870–71; rector of Plattsmouth, Neb., 1873; and other pastorates in Minneapolis, Northfield, Minn., and Bennington, Vt. In 1890 he was consecrated bishop of the Platte, now the district of western Nebraska. He resigned in October 1910. He has published 'The Farmer Boy Who Became a Bishop'; 'Sermons for Lay-Readers.'

GRAVES, Frederick Rogers, American Protestant Episcopal bishop: b. Auburn, N. Y., 1858. He was graduated at Hobart College (1878), and the General Theological Seminary (1881). His ministry has been devoted to work in China, and he is the author of several works in the Chinese language. His consecration as bishop of Shanghai took place in 1893.

GRAVES, John Temple, American journalist and orator: b. Wellington Church, Abbeville District, S. C., 9 Nov. 1856. He was graduated at the University of Georgia in 1875. He is well known as an orator and leader of patriotic sentiment in the South. He was on the staff of the Atlanta *Journal;* was editor of Atlanta *Daily Georgian* 1905–07; and from 1907 to 1915 editor of the New York *American.* Since 1915 he has been editorial representative of the Hearst newspapers. In 1908 he was candidate of the Independence party for Vice-President. He became president of the New York Press Club in 1913; is well known as a progressive and patriotic leader, an advocate of universal peace by arbitration, of national preparedness as the best guarantee of peace, and of separation of black and white races. He has written 'History of Florida of To-Day'; 'History of Colleton, S. C.'; 'Speeches and Selections for Schools' and 'The Negro.'

GRAVE'S DISEASE. See THYROID, DISEASES OF.

GRAVITATION. The law of gravitation is the law discovered by Newton, according to which every portion of matter attracts every other portion with a force directly proportional to the product of the two masses, and inversely proportional to the square of the distance between them. The motion of the planets round the sun in ellipses, each marking out the area of its orbit at a constant rate, and each having a year proportional to the square root of the cube of its mean distance from the sun, implies that there is such a force on each planet exactly proportioned to its mass, directed toward, and inversely as the square of its distance from the sun. The lines of force radiate out from the sun on all sides equally, and always grasp any matter with a force proportional to its mass, whatever planet that matter belongs to. Since the force is always proportional to the mass acted on, and produces the same change of velocity whatever that mass may be, the change of velocity tells us nothing about the mass in which it takes place, but only about the mass which is pulling. If, however, we compare the accelerations due to different pulling bodies, as for instance that of the sun pulling the earth with that of the earth pulling the moon, or if we compare changes in motion due to the different planets pulling each other, then we can compare their masses and weigh them one against another and each against the sun.

All this was clearly seen by Newton, and was set forth in his 'System of the World' (3d ed., p. 41). Kepler (q.v.) had indeed given the laws, deduced from observation, according to which the planets describe their orbits. From these Newton deduced the laws of the force in the case of the planets; and subsequently he generalized the statement of them, by showing the identity of the nature of the force that retains the moon in her orbit, and that which attracts matter near to the surface of the earth. Kepler's laws state, first, that every planet revolves around the sun in an ellipse, of which the sun occupies one focus; second, that the velocity of any planet at different parts of its orbit is such that the radius vector from the sun to the planet sweeps over equal areas in equal times; and third, that the distances of the various planets are so related to the periods of their revolution that the squares of the periodic times are proportional to the cubes of the mean distances from the sun. From these laws Newton made the following deductions: He inferred from the second law that the planet is acted on by a central force that is always directed toward the sun. From Kepler's first law he deduced the law of variation of the force for any one planet, and found that the force varies inversely as the square of the distance of the planet from the sun. Lastly, he concluded from Kepler's third law a relation between the forces on the various planets; namely, that the forces on equal masses of the different planets are inversely proportional to the squares of the distances of those planets from the sun. This law indicates the identity of the nature of the force that acts on the different planets. Newton next proceeded to consider the motions of the moon; and to ask the question, "Is not the force that causes the moon to fall toward the earth the same as that which influences falling bodies near to the earth's surface?" This question he attempted to put to the test of calculation. At first he was unsuccessful. The then received estimate of the dimensions of the earth were so far from correct that the comparison between the force of attraction in a stone and that in the moon at her distance from the earth did not exactly agree with his theory, and he was obliged to give it up for nearly 20 years. It was not till 1684, when he heard a paper of Picard read at the Royal Society of London, on new geodetical measurements of the earth, that he obtained accurate data to work with; and, returning home, he set to work to examine the question afresh.

Newton saw that a mountain mass might be used, and weighed against the earth by finding how much it deflected the plumb-line at its base. The density of the mountain could be found from specimens of the rocks composing it, and the distance of its parts from the plumb-line by a survey. The deflection of the vertical would then give the mass of the earth. Not long after Newton's death the mountain experiment was actually tried. The honor of making the first experiments on gravitation belongs to Pierre Bouguer (q.v.), whose splendid work does not appear to have received the credit due it.

Having established the law of gravitation throughout the solar system, it was natural to infer the universality of its action. We know on the one hand, by observing the motion of the planets and satellites, the asteroids, and the comets, that the law holds with great exactness for all these bodies; on the other hand, experiments of Cavendish with balls of lead, and of others, verify its exactness down to very short measurable distances: and though we are unable with our present appliances to determine the orbits of double stars and of other stellar systems, still we seem to be fully justified in assuming that in these cases also the law stated above holds, at least, very approximately.

The track was first laid down by Newton, based on astronomical observations, and only made firmer and broader by every later observation. Important work in Europe has recently been done in gravitational experiments by the late Prof. U. Jolly, and by Profs. Braun, Boys and Poynting, who, with others, have advanced beyond the results of Henry Cavendish (q.v.), whose device, known as the Cavendish experiment, for determining the density of the earth, has so long interested scientists. The latest research has verified Newton's celebrated guess that «the quantity of the whole matter of the earth may be five or six times greater than if it consisted all of water.»

No inquiry on gravitation has showed that it is related to anything but the masses of the attracting and the attracted bodies. It appears to have no relation to physical or chemical condition of the acting masses or to the intervening medium. This independence of gravitation of any quality but mass, bars the way to any explanation of its nature or source.

There is a point respecting the law which is almost universally passed over without notice, although it is one of the most important questions with respect to the construction of any theory to account for gravitation; namely, the exact proportionality of the gravitating forces of any two bodies to their masses. The most delicate experiments show no deviation from the exactness of this law; nor has the most accurate observation of planetary bodies sufficed to detect any such deviation. This is the fact proved by the well-known guinea-and-feather experiment, in which it is shown that though a mass of gold and a feather do not fall equally fast under ordinary circumstances, because of the unequal resistance of the air in the two cases, yet that, the air being removed by means of the air-pump, they fall with equal velocity. The experiment proves that the force of gravity in the two cases is exactly proportional to the mass of the guinea and of the feather. Newton showed the same thing himself with far greater minuteness by vibrating balls of various materials similarly suspended. In this, which is known as Newton's pendulum experiment, it is shown that pendulums of equal length vibrate in equal times whatever be the material and the masses of which the bobs of the pendulum are made. By this experiment, when performed with all the nicety at command, it is probable that any deviation amounting to a ten-thousandth or a hundred-thousandth part of the whole amount considered could be detected. Planetary motions prove the law to even a greater degree of accuracy. It is curious that this portion of the law, though it is only proved by experiment and observation, is hardly ever, if ever, referred to by popular writers. It is either assumed without pretense of proof, or is passed over without remark.

Notwithstanding the vast interest and importance of the study which this subject presents, and all the labors of eminent scientists in endeavors to solve its complex problems, it still remains to be said that the world is yet without any theory which can really be considered as explaining gravitation. Consult Mackenzie, 'The Laws of Gravitation' (1900).

GRAVITY, in physics, the linear acceleration downward of falling bodies, due to the gravitation of the earth. If the earth were a perfect sphere, gravity would be uniform at all points of its surface; but because the earth is flattened at the poles, and therefore the polar radius is less than the equatorial radius, gravity is greater at the poles. Newton (q.v.) and Bessel have shown that in a vacuum a sovereign and a feather will fall with equal speed, though in atmospheric air the rate will be different owing to the air's resistance. The attraction of the whole earth, considered as a sphere, on a body at its surface, is the same as if the whole matter of the earth were collected at its centre, and the nearer to its centre the greater the force exerted. Gravity is symbolized in physics by the letter g. The value of g as given by Helmert's formula is, in feet per second, $32.0875\ (1 + 0.0005302 \sin^2 \Phi - 0.000007 \sin^2 2 \Phi)$, at the sea-level, Φ representing the latitude north or south of the equator. At the equator it is about 32.0875 feet per second, and at the poles about 32.2577 feet per second. See FORCE OF GRAVITY.

GRAVITY, Specific. See SPECIFIC GRAVITY.

GRAY, Asa, American botanist: b. Paris, Oneida County, N. Y., 18 Nov. 1810; d. Cambridge, Mass., 30 Jan. 1888. He was graduated at the Fairfield Medical College in 1831; but had already acquired a taste for natural science which led him to abandon the practise of medicine for the study of botany. He became curator of the New York Lyceum of Natural History. The flora of the United States was by no means well known and classified at that period, and many botanical problems were to be solved by the attainment of new data in his chosen science. He had attracted notice so early as 1834 and was appointed botanist to the Wilkes Exploring Expedition, which was so dilatory in starting that he resigned the position in 1837, and in 1842 was elected Fisher professor of natural history at Harvard University. Between the resignation of his post as botanist to the Wilkes Expedition and his acceptance of the chair at Harvard, he took the opportunity of traveling over Europe, where he made many social and scientific friends and in England met Dean Church of Saint Paul's, London, then Fellow of Oriel College, Oxford, with whom he kept up a correspondence of the most intimate friendship until his death. Both were many-sided men of keen intellect and reverent minds. From 1842 to 1873, when he retired from his professorate at Cambridge, the life of Gray is to be read in his published works. He gradually developed the reputation of a botanist of the first rank, one of the greatest of his century and certainly the greatest his country had ever produced. His lot was cast at a point in the history of science when the artificial system of botany was to pass away, and the new and natural method was to undergo development. There were vast masses of new material constantly pouring in from the newly explored Middle Western Territories, together with the rich spoils that government expeditions were bringing by sea from the Pacific Coast. Professor Gray, with the assistance of Dr. John Torrey (see TORREY, JOHN), set about to arrange these multitudinous specimens in accordance with the newest methods; to identify, name and classify them. His work was to be called the 'Flora of North America,' and was to be a comprehensive history of the botany of the country upon a classification basis of natural affinity. This work was not completed beyond the order of *Compositæ*, as the constant accessions of new specimens rendered the portions already published out of date, and proved that the attempt at so colossal an undertaking would be premature before all the material was in, and every specimen had been deliberately examined and classified. Yet Gray's pen could not be idle, and he published volume after volume in which he showed he was as clear and concise as an exponent of botany in its elementary principles as he was skilful and bold in wide generalizations and profound analysis. His scientific position was that of a theistic evolutionist. He dissented from Darwin's opinion that variation was the result of fortuitous contingencies. He was a teleologist and believed that species were differentiated according to a preordained plan in the mind of a creator, and he was of the spirit that could subscribe to evolution and yet repeat the Catholic creed. His principal writings are as follows: 'Elements of Botany' (1836); 'Structural and Systematical Botany' (1879); 'Manual of Botany for the Northern United States' (1848); 'Genera Boreali-Americana Illustrata' (1849); 'Botany of the United States Exploring Expedition under Captain Wilkes' (1854); 'Plantæ Wrightianæ Texano-Neomexicanæ' (1853); 'Darwiniana, Essays and Reviews Pertaining to Darwinism' (1876); 'Synoptical Flora of North America' (1884); 'Natural Science and Religion' (1880); published posthumously, but edited by Sargent, 'Scientific Papers of Asa Gray' (1889); and 'Letters of Asa Gray' (1894).

GRAY, Barry. See COFFIN, ROBERT BARRY.

GRAY, David, American journalist: b. Buffalo, N. Y., 8 Aug. 1870. He was graduated from Harvard in 1892, where he wrote the Hasty Pudding Club play 'The Sphinx,' entered journalism in 1893 as a reporter and editorial writer for the Rochester *Union and Advertiser*, became managing editor of the Buffalo *Courier* in 1897, and after a course in law was admitted to the bar in 1899. He has published 'Gallops,' a collection of fox-hunting sketches reprinted from the *Century* in two volumes, 'Mr. Carteret and His Fellow Americans Abroad,' 'Ensign Russell' and various short stories in current periodicals. In 1906 his play 'Gallops' based on his stories was produced at the Garrick Theatre, New York, and ran through the season.

GRAY, Elisha, American inventor: b. Barnesville, Ohio, 2 Aug. 1835; d. Newtonville, Mass., 21 Jan. 1901. During his attendance at Oberlin College his skill in handicraft enabled him to support himself by carpentry. He left college to apply himself to the improvement of electrical apparatus; and in 1867 received his first patent for self-adjusting telegraph relay. He subsequently invented the telegraphic switch and annunciator for hotels and the telegraphic repeater, the private telegraph line printer. The litigation between him and Alexander Graham Bell, both of whom claimed to be inventors of the telephone, resulted in a verdict in favor of the latter, whose rights were sustained by the Supreme Court. The telautograph, by which written messages were to be sent over the telephone or telegraph was patented by him in 1893. For many years he was engaged in the manufacture of electrical apparatus in Chicago and Cleveland and founded the Gray Electric Company in Highland Park, Ill. The Congress of Electricians at the World's Columbian Exposition was organized by him in 1893, and he was elected to preside at its sittings. Among his writings the most notable are 'Experimental Researches in Electro-Harmonic Telegraphy and Telephony' (1878); and 'Elementary Talks on Science.'

GRAY, Henry Peters, American painter: b. New York, 23 June 1819; d. there, 12 Nov. 1877. He was a pupil of Daniel Huntington in 1838, and after several years abroad he established himself in New York, and was president of the National Academy 1869–71. Among the most important of his works are 'Wages of War,' now in the Metropolitan Museum; 'The Judgment of Paris'; 'Cupid Begging his Arrows'; 'Apple of Discord'; 'Blessed are the Pure in Heart,' an illustration of Irving's 'Pride of the Village'; 'Hagar and the Angel.'

GRAY, Horace, American jurist: b. Boston, 24 March 1828; d. Nahant, Mass., 15 Sept. 1902. He was graduated from Harvard in 1845; from the Harvard Law School in 1849; studied law also in the office of Judge Lowell; was admitted to the bar in 1851, and in 1854–61 was reporter of the Massachusetts Supreme Court. At the same time he became a leader of the Massachusetts bar, in 1864 was appointed an associate justice of the State Supreme Court and in 1873–81 was chief justice. In 1881 he was appointed to the Supreme Court of the United States, and this post he held until his resignation in 1902.

GRAY, John Purdue, American alienist: b. Half Moon, Pa., 1825; d. Utica, N. Y., 29 Nov. 1886. He was graduated from Dickinson College in 1846 and took a medical degree at the University of Pennsylvania in 1848. He was successively assistant physician and medical superintendent of the New York State Asylum at Utica. He introduced many improvements into the treatment of the insane, and was for many years editor of the *American Journal of Insanity*.

GRAY, Maxwell. See TUTTIET.

GRAY, Robert, American discoverer: b. Tiverton, R. I., May 1755; d. Charleston, S. C., 1806. In 1787 he was appointed to the command of the sloop *Washington*, equipped by Boston merchants for trade with the Indians of the Pacific Coast. He returned in the *Columbia* in 1790, and, proceeding by way of Canton, was the first to carry the United States flag around the earth. During a second voyage he discovered the Columbia River, which he named from his ship. He was subsequently in command of trading vessels.

GRAY, Thomas, English poet and scholar: b. Cornhill, London, 26 Dec. 1716; d. Cambridge, 30 July 1771. He was the fifth child and only survivor of 12 infants born to Philip Gray, a money-scrivener, and Dorothy Antrobus, a one-time milliner. The father was brutal and maltreated his wife, who had to support herself and her son. When Gray was 11 he was sent to Eton, where his uncle, William Antrobus, was one of the masters. Here he formed a close intimacy with a few boys of quiet tastes — notably with Horace Walpole (q.v.) and Richard West, upon whose death he wrote one of the few sonnets to be found in the literature of the early 18th century. Seven years later (1734), Gray became a pensioner at Peterhouse, Cambridge, Walpole coming up the next year but to another college. Gray found the courses at Cambridge unsatisfactory, his tastes being at that time literary rather than scientific and philosophical, and he was not sociable or inclined to sports. He left in 1738 without taking a degree and lived a few months in London before he accepted Horace Walpole's invitation to become his companion on a "grand tour" of the Continent. They left England late in March 1739, spent some months in France and Switzerland, crossed into Italy in November, visited Florence, Rome and other cities, returned to Florence in July 1740 and passed some time with Horace Mann, the English Minister, afterward Walpole's correspondent, and in April 1741 started for Venice but parted at Reggio in consequence of a quarrel as famous as it is mysterious in its details. It seems quite certain that Walpole's confession to William Mason (q.v.), the poet and biographer of Gray, that he treated his sensitive companion superciliously and so caused the rupture, is in essentials the true explanation; it seems also certain that their friendship would never have been renewed if anything very disgraceful had occurred; but it is equally likely that something happened about which it was desirable to keep silence. Gray went on to Venice by himself, returned through Verona, Milan and other places, paid a second visit to the Grande Chartreuse, where he wrote in the album the famous 'Alcaic Ode' (August 1741 — the original was destroyed by a mob in the French Revolution), and reached home 1 Sept. 1741. Two months later, his father, with whom Gray seems to have been on better terms than the parent's brutality warranted, died of gout after having squandered a fairly considerable fortune.

Gray and his mother remained in London for some time, the former suffering from a naturally morbid temperament and the loss of his friend West, making but slight efforts to enter the profession he was dallying with, the law. In October 1742 Mrs. Gray went to live with her two sisters in the house of one of them at Stoke Poges in Buckinghamshire, and Gray betook himself to Cambridge in order to study the civil law. He was made LL.B. in 1743, but really spent most of his time reading Greek and annotating what he read with the care he had displayed in noting down what interested him during his tour.

Cambridge, though he disliked the place and had few congenial friends there, became practically Gray's residence for the rest of his life, since he could live comfortably on his small income and could have access to books. Among his few friends, who did not, however, remain in Cambridge permanently, were his correspondents, Dr. Thomas Wharton and the Rev. William Mason, the latter a rather servile literary follower. In 1744 the friendship with Walpole was renewed and Gray became a visitor to Strawberry Hill. He also went every summer to Stoke Poges to see his mother, who died there in 1753. But he could never be drawn out by others, and he never "spoke out." A small literary controversy has arisen over the reasons of his sterility as a writer, some attributing it mainly to his retiring character and his constitutional melancholy and delicate health (*cf.* D. C. Tovey, 'Gray and his Friends' (1890); and W. L. Phelps, 'Selections from Gray's Poems' (1894); others, of whom Matthew Arnold is the main exponent, emphasizing the blighting influence exercised upon Gray's essentially romantic genius by the dominance of the pseudo-classical school of Pope (*cf.* Arnold's essay on Gray in 'Ward's Poets,' Vol. III). There is probably something in both views. Gray was shrinking and fastidious in temperament, and he was also depressed by the standards of his age in respect to poetry; for, if he was not, he presents, as Arnold claimed, the extraordinary phenomenon of a poet whose achievements show the powers of a master producing far less than equally fastidious and delicate masters who have had the good fortune to write in epochs more propitious to their genius.

Meanwhile, Gray, indolent and irresolute though he was, had slowly laid the basis of his fame as a poet. In 1742 he wrote the sonnet to West, and the pensive and beautiful 'Ode on a Distant Prospect of Eton College' (published anonymously, 1747). In 1743 be began, but soon discontiued, his ably sententious poem on "The Alliance of Education and Government"— forestalled by the appearance of Montesquieu's 'Esprit des Lois,' but an interesting proof that Gray tried to get himself somewhat in touch with his contemporaries. Five years later the 'Ode to Spring' and the stanzas on the drowning of Walpole's cat appeared, and in 1749 he took up again the most famous of all his poems, the 'Elegy Written in a Country Churchyard,' which had been begun in 1742. It was finished at Stoke Poges in June 1750, and attracted so much attention in manuscript that a pirate announced his intention of printing it. This caused Gray to authorize Dodsley, to whom he rather loftily yielded all the profits, to print an edition in February 1751. It attained at once the popularity it has never lost, and was much imitated and parodied throughout the Western world. In August 1750 that admirable piece of *vers de société*, 'A Long Story,' was written, and in 1753 his six best poems, including a 'Hymn to Adversity,' were published with designs by Richard Bentley. The next four years saw the writing and printing (at Strawberry Hill) of the two Pindaric odes, 'The Progress of Poesy' and 'The Bard'— not the earliest but among the best of their kind in English and exhibiting, as Gray and Arnold thought, the highest reaches of Gray's poetic genius. Curiously enough many people found them obscure, but they had warm admirers from the beginning, one of whom secured for Gray, late in 1757, the offer of the Laureateship, which he declined.

The rest of Gray's life is summed up in his friendship, his studies and his travels. In 1756 he changed his quarters from Peterhouse to Pembroke because some undergraduates, hearing that his fear of fire had caused him to buy a rope ladder, induced him by their cries to use it and in consequence to land himself in a tub of water. The rude prank was not followed by the proper punishment, and Gray was very indignant. He found consolation, however, in making young friends like Norton Nicholls, in studying (1759–61) in the newly opened British Museum and in taking tours through regions marked by romantic scenery, to the beauties of which he was one of the first Englishmen to open his eyes appreciatively in a modern fashion. In 1764 and 1765 he visited Scotland (making friends with a fellow Romanticist, James Beattie — q.v.), and in 1769 he paid the famous visit to the English Lakes described in his journal. In connection with his love of romantic scenery and with the morbid temperament, which gave him his post of eminence among the "Churchyard Poets," should be mentioned his enthusiasm for the buildings and the writings of the "Gothic" past — another characteristic feature of the new school of revolt from classicism. Gray was delighted with Macpherson's 'Ossian' and wrote in imitation of the Norse and Welsh his 'Fatal Sisters'; 'Descent of Odin'; and 'Triumphs of Owen' (published 1768). In 1762 he had applied for the regius professorship of history and modern languages at Cambridge, but had failed to secure it; six years later, his successful competitor having died from an accident when drunk, the post with its good salary and nominal duties was given to Gray. He did not wish to seem ungrateful and so, in return for the Duke of Grafton's kindness, he wrote an ode for the installation of that worthy as chancellor of Cambridge (1 July 1769). The next year he visted London with his young friend the Swiss naturalist, Bonstetten, but in 1771 he was forced to deny himself the pleasure of going to see this friend in his foreign home. He was taken violently ill with gout of the stomach and died on 30 July. He was buried a week later in a vault with his mother at Stoke Poges.

Despite the paucity of his poetry, Gray's position as a classic has long been secure. He is the chief English elegist and eminent as a master of the elaborate, not the simple and singing lyric. His letters are among the most charming of his period, and his notes on classical and mediæval authors, on genealogy, heraldry, painting, architecture, ornithology and botany show the extraordinary range of his accomplishments. His knowledge of Norse has been greatly exaggerated (*cf.* G. L. Kittredge in Phelps), but in certain senses Leslie Stephen did not exaggerate when he wrote in the 'Dictionary of National Biography,' àpropos of a man who could admire almost equally Shakespeare and Racine, that Gray, "the most learned of all our poets . . . was naturally an eclectic." See Elegy in a Country Churchyard.

Bibliography.— For Gray's life see the biography by Mason (1774) — not that by Johnson, which is one of the worst of the 'Lives,'— and also the letters given in the editions of Mitford and Gosse. The latter (4 vols., 1884) is the fullest. There are numerous editions of the poems, e.g., the new 'Aldine' by John Bradshaw (1891); and there is a fair amount of criticism to be found in the books previously named and in Gosse's biography in the 'English Men of Letters' (1882). Add the works of Phelps and Beers on English Romanticism in the 18th century and the histories of English literature, as well as a good essay by Lowell. Tovey's 'Gray and His Friends' contains a considerable amount of previously unpublished material.

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GRAY, William Crane, American Protestant Episcopal bishop: b. Lambertville, N. J., 6 Sept. 1835. He was graduated at Kenyon College (1859); ordained deacon in 1859 and priest in 1860. He was consecrated bishop of southern Florida in 1892.

GRAY DUCK, the gadwall (q.v.).

GRAY WHALE (of California). See Rorqual.

GRAYBACK, the name, in popular speech, of several animals strikingly gray in color, as the gray whale (see Rorqual); the knot (q.v.) and certain other shorebirds; or a body-louse. See Louse.

GRAYBEARD MOSS. See Usnea.

GRAYHEN. Feminine of Blackcock (q.v.).

GRAYLAG GOOSE. See Geese.

GRAYLING, a fish of the family *Thymallidæ,* much resembling a slender salmon, 15 to 18 inches long, and formerly included in the salmon family. Some five species of the single genus *Thymallus* are known, all inhabitants of northern regions, in rapid streams where the water is clear and cool and the bottom sandy or pebbly. Its habits are similar to those of trout, except that it spawns in the spring. Its flesh is excellent, with an odor and flavor, when fresh, of wild thyme. It is caught by fly-fishing as for trout, and is a favorite with anglers. The European grayling extends from Russia, Siberia, Scandinavia and England to Switzerland and Hungary. Two species are known in North America, each with so limited and scattered a distribution that they are regarded as modified relics of a preglacial circumpolar species. The Arctic grayling, or "poisson bleu" (*T. signifer*) of the fur-hunters, inhabits only the Mackenzie Basin and rivers in Alaska. The more southerly and familiar grayling (*T. tricolor*) is restricted to certain streams in northern Michigan, where it is almost extinct, and seems incapable of recovery by fish-cultural methods; and to Montana. These fish are distinguished from trout or salmon by the large size of the dorsal fin and by their grayish hue, with half-a-dozen deep blue spots on the forepart of the abdomen. Consult Pritt's 'Book of the Grayling' (London 1888); and Jordan and Evermann's 'American Food and Game Fishes' (New York 1902).

GRAY'S INN, one of the four Inns of Court (q.v.) in London, situated on the north side of Holborn and to the west of Gray's Inn lane. It contains a hall of the period of 1560. It derives its name from the noble family of Gray of Wilton.

GRAY'S PEAK, a peak in the Colorado range, in Colorado, one of the highest in the Rocky Mountains. Its height is 14,341 feet. It was named in honor of Asa Gray, the botanist.

GRAYSON, William, American revolutionist and senator: d. 1790. The date of his birth in Prince William County, Va., is unrecorded. He graduated at Oxford University, England; studied law at the Inner Temple, London, and returned to America to practice as a lawyer at Dumfries, Md. Strongly opposed to the colonial administrative methods of George the Third's government, he became an active revolutionist and in 1776 was aide-de-camp to General Washington. As colonel of a Virginia regiment he gained distinction at the battle of Monmouth; was appointed commissioner by Washington to treat with General Howe in the exchange of prisoners; and was a member of the board of war 1780–81. At the close of the Revolutionary War, he again became a lawyer in Virginia. From 1784–87 he was a member of the Continental Congress; in 1788 was a delegate to the convention to consider the new Federal Convention; and the year before he died was selected as one of the Virginian senators in the first national Congress.

GRAYWACKE, grā'wăk, a rock name very loosely used. The term has been commonly applied to a shaly sandstone, usually of dark color. More specifically it indicates a rock consisting of fine fragments of incompletely weathered basic igneous rocks bearing the same relation to these that arkose bears to granite. See ARKOSE.

GRAZ, or **GRATZ,** grāts, Austria, the capital of the crownland of Styria, on the river Mur, 140 miles by rail southwest of Vienna. The town is noted for its beauty and its picturesque setting in attractive scenic surroundings amid the Styrian Alps. It is traversed by the river which spanned by seven bridges connects the inner town on the left bank with the town on the right bank. The inner town is built around the former fortified Schlossberg, dismantled by the French in 1809. The Stadtpark is at the foot of the Schlossberg, the summit of which commanding a beautiful outlook is reached by a cable tramway. The mediæval ramparts and bastions have been replaced by attractive tree-lined promenades. Graz dates from the 9th century. Among the chief buildings are the 11th century castle, now used as government offices; the 16th century Renaissance landhaus where the local diet assembles; the arsenal dating from 1644 and containing a valuable historical armory of 15th to 17th century weapons; the town hall built in 1807, and rebuilt in German Renaissance architecture in 1892; the university buildings dating from 1573; the law courts; the Joanneum Museum founded in 1811 with its important collections and great library, and the technical college founded in 1814. The Gothic cathedral of Saint Ogidius, dating from 1450–62, occupies the site of a former church founded 1157. The Gothic parish church finished in 1520 was restored in 1875; the Augustinian University church; and the small 13th century Leech Kirche are also interesting buildings; the early Gothic Herz Jesu-Kirche, completed in 1891, has a tower 360 feet high. An important railway centre with extensive railway shops, and direct communication with the Köflach coal-fields, Grätz is a busy industrial town manufacturing and carrying on a lucrative trade in iron and steel wares, paper, artistic printing and lithography, physical and optical instruments, chemicals and a domestic commodities. Pop. 152,000.

GREASE-BUG, or **OVERFLOW-BUG,** a ground-beetle (*Platynus maculicollis*), common in California, and occasionally a pest in houses because of its disagreeable odor when crushed, and because it nibbles bread and meats.

GREASEWOOD, a very thorny, almost leafless shrub (*Sarcobatus vermiculatus*) of the goosefoot family (q.v.), which abounds among the sage brush on the arid plains of the western United States, especially where the soil is saline. The wood is yellow, very hard and tough.

GREAT AUK. An extinct auk (*Plautus impennis*), much like the existing razor-bill, but larger (nearly the size of a goose), with a larger bill and relatively smaller wings; formerly called garefowl. It was black above and white below, with a conspicuous white patch in front of the eye. It was an expert swimmer and diver, but unable to fly on account of the very small size of its wings. The habits of the garefowl were those of auks generally, but its range was limited on the American coast to the vicinity of Newfoundland. It seems never to have lived north of the Arctic Circle; but its bones in shell-heaps testify to its former occurrence, at least in migrations, southward as far as Florida. These birds bred on small islands off the coast of Iceland, and on the Orkneys and Hebrides. Early in the 19th century they disappeared from these haunts, mainly through the persecution of fishermen and sailors who had for years killed them for food, bait and feathers; but they lingered somewhat longer in the Gulf of Saint Lawrence. Cartier's vessels visited Funk Island in 1534, and the crews easily filled two boats with the birds which they knocked down with sticks; and their abundance was mentioned as one of the inducements for settlers to come to Newfoundland. For many years the colony was ruthlessly harried, yet a few pairs survived until about 1840. A small breeding-place remained in Iceland until 1844, when the last few pairs were killed as museum specimens. The skins of this auk have been sold for $650, and an egg for $2,500. About 78 specimens of the bird are preserved in museums throughout Europe and America. Consult Newton's 'Dictionary of Birds,' article

'Garefowl,' and articles by F. A. Lucas in 'Reports United States National Museum' for 1887–88 and for 1888–89.

GREAT AWAKENING, the popular name of a great and tenacious «revival» in New England, 1740–45, under the influence of Jonathan Edwards and George Whitefield. Edwards had created a similar excitement in Northampton five years before, the embers of which were still glowing, but on Whitefield's visiting him in the fall of 1740, and preaching his thrilling sermons in addition to Edwards', the wave spread all through New England, involving over 150 towns, and rising almost to frenzy. It was marked by the extremest accompaniments of bodily seizures, convulsions, hysteria, etc., and aimed especially to bring young children under its control. Edwards was rightly considered its author and was fiercely denounced for its irrationality and evil effects on public worship, as well as the temporary ruin of calm and fruitful work; he defended it for some time, but its results at last came to be deplored even by its champions, and by 1742 it was threatening not only the peace but the life of the churches. So bad were its effects that to the reaction has been attributed the religious deadness of the country for the next 60 or 70 years. The separation of the «converted» into an arrogant clique who often seceded in separate churches, the upspringing of a horde of ignorant lay preachers making physical effects the touchstone of religion, the indecent rivalry in «manifestations,» the denunciation of all the trained ministry as lacking divine grace, were only a part of its demoralizing outcomes. The faculties of Yale and Harvard colleges pronounced against it, as did the leading divines; the Massachusetts General Convention of 1743 added its testimony, and in Connecticut an effort was made to enforce the Saybrook Platform against the independence of congregations.

GREAT BARRINGTON, Mass., town in Berkshire County, on the New York, New Haven and Hartford Railroad and on the Housatonic River, 40 miles west of Holyoke. In the town are three villages: Great Barrington, Housatonic and Van Deusen. It was settled in 1725, but formed a part of Sheffield until 1761. William Cullen Bryant was town clerk for several years and the thoughts in many of his poems were suggested by the beautiful Berkshire scenery. The town has two public libraries, the Hopkins Memorial Manse, the Sedgwick Institute and a number of good elementary schools. The manufactures are cotton goods, electrical apparatus and paper. Owing to the picturesque scenery of the vicinity it is a popular summer resort. The government is carried on by annual town meetings. Pop. 5,926. See Taylor, 'History of Great Barrington' (Great Barrington 1882).

GREAT BASIN, a vast region of interior drainage, a triangular plateau of North America, occupying the western part of Utah and nearly the whole of Nevada, parts of Oregon and California and extending at its northeast angle into Idaho. It is bounded on the west by the Sierra Nevada and on the east by the Wasatch Mountains. The base of the triangle at the north is 500 miles from east to west and the extent from north to south is 800 miles. The area is about 210,000 square miles, a little larger than France. It is traversed by numerous mountain ranges, irregular in arrangement; the valleys are mostly sinks, the chief drainage centre being Great Salt Lake (q.v.). The areas of greatest depression are to be found near the borders and the greatest elevation near the central part. The highest range is the East Humboldt, one peak of which, Mount Bonpland, is 11,321 feet in height. Volcanic masses form or conceal the original rocks of many of these ranges. The slopes and the geological markings show that the lakes and rivers which once existed within this region have become smaller and some have disappeared. Among the more notable of the extinct lakes are Bonneville and Lahontan. The greater portion of this section was once in the basin of the Columbia River. The Great Basin contains many streams and lakes (the latter for the most part salt) whose waters never reach the ocean, but are either taken up by evaporation or their waters sink in the desert sands. The mean annual rainfall ranges in different localities from 4 to 15 inches. The plateau is nearly destitute of trees and in general only the upper parts of the valleys are clothed with desert shrubs, their lower portions often being covered with muddy water or with several inches of alkaline salts left by evaporation. The chief arid places are the Great Salt Lake Desert, the Mohave Desert and the Carson Desert. This basin is rich in mineral wealth; gold, silver, iron ore and copper exist here in large quantities. The Great Basin is among the large interior drainage sections of the world; but the interior drainage basin of Asia is 23 times as great and the Sahara 16 times as great.

GREAT BEAR LAKE. See BEAR LAKE, GREAT.

GREAT BEND, Kan., city, county-seat of Barton County, on the Arkansas River, the Missouri Pacific and the Atchison, Topeka and Santa Fé railroads, about 92 miles northwest of Wichita. The Central Normal College is located here and it contains a Carnegie library, a hospital and an Elks' Home. It is the trade center of a rich farming and stock-raising region, has flour mills, iron works, machine shops, grain elevators and a refrigerating plant. The commission form of government was adopted in 1913. Pop. 4,622.

GREAT BRIDGE, Va., Battle at, 9 Dec. 1775. Lord Dunmore, royal governor of Virginia, hearing that a patriot force from North Carolina was on the way to occupy Norfolk, the largest town in Virginia and its chief port, built a rough fort at Great Bridge, over the Elizabeth River, commanding the southern approach. The Virginia patriots raised a band of sharpshooters, including John Marshall, afterward chief justice of the United States Supreme Court, took possession of the opposite bank and in a 15-minute fight, which cost Dunmore 61 regulars and the militia none, forced him to abandon the fort. A few days later the Virginians occupied Norfolk, which the spiteful governor set on fire before taking refuge in a war-ship in the harbor. The town was reduced to ashes.

GREAT BRITAIN. The following series of articles dealing with the various aspects of British educational, religious, political and commercial life, presents the history, development and rise of the United Kingdom to its prominent position among the leading nations of the world. The peculiarities of British institutions make it impossible to understand them apart from their history, and the aim set before the contributors has been to furnish a well coordinated section, reviewing the leading characteristics of the British nation and its advance, as they are seen to be the natural outcome of history.

1. Geographical Environment.
2. The Conquests.
3. Mediæval England.
4. The Reformation in England.
5. English History of the 17th Century.
6. History of the 18th Century.
7. The French Wars of the 18th Century.
8. History of the 19th Century.
9. The Political Parties to 1906.
10. The Political Parties, 1906–1918.
11. Parliament.
12. Parliament Act, 1911.
13. Crown and Cabinet.
14. The Judicial System in England and Wales.
15. Local Government.
16. The Civil Service.
17. Scottish History.
18. Irish History.
19. Welsh History.
20. National Finance.
21. Banking.
22. Commerce — 18th Century.
23. British Commerce.
24. Navigation Acts.
25. British Shipping.
26. British Railways.
27. The English Land Law.
28. Agriculture — The 18th Century.
29. Agriculture since the 18th Century.
30. British Fisheries.
31. The Mining Industry.
32. The Industrial Revolution.
33. British Trade Unionism.
34. The Labor Movement in Politics.
35. The Co-operative Movement.
36. British Factory Legislation.
37. The Church of England.
38. English Nonconformity.
39. English Roman Catholics.
40. English Judaism.
41. British Education.
42. Engineering in Great Britain.
43. English Newspapers.
44. The Trend of Thought and Literature in the 19th Century.
45. The British Navy.
46. The British Army.
47. British Foreign Policy in Europe.
48. British Foreign Policy in India.
49. British Foreign Policy in Africa and America.
50. The Free Trade Movement.
51. The British Tariff Movement: its Origin, Theory and Prospects.
52. Great Britain and the World War.
53. Great Britain, Diplomatic Relations of the United States with.

See also British Empire; England; Wales; Scotland; Ireland; Australia; New Zealand; Canada; Newfoundland; India; South Africa; and other British colonial possessions.

1. GEOGRAPHICAL ENVIRONMENT.

The Greeks could not have played their decisive rôle in history had they not dwelt in the centre of the lands, amid the islands and peninsulas between Europe and Asia. Nor is it likely that any race less happily endowed could have achieved what the Greeks achieved even in that favored environment. A like relation is true as between the British race and the British Isles.

The origins of the British race are recounted in the next article of this volume. It is the aim of the present article to analyse the geographical influences which have contributed to British history.

Popular philosophy, as embodied in Shakespearian phrases such as the «moat defensive» and the «silver streak,» would dismiss the matter as almost too simple and obvious for set discussion. The insularity of Britain has no doubt counted for more than any other single geographical cause, but the British polity and character are in fact the product of a very singular combination of geographical no less than historical circumstances. For the purposes of this short summary the major geographical controls of British development may be grouped under the nine following heads:

1. Insularity.
2. Shallow surrounding seas.
3. Neighborhood to the Continent.
4. Relation to the chief linguistic frontier of Europe.
5. Climate determined by oceanic winds.
6. Internal natural divisions.
7. Adequacy of economic bases.
8. Geographical momentum.
9. The consequences of sea power.

1. Insularity.— Britain has not been successfully invaded since the defeat at Hastings eight and a half centuries ago. The Englishman is ever conscious of this fact — it is a frequent argument in 20th century political speeches. The victories over the Spanish Armada and at Trafalgar have served to increase the sense of security, and freedom at home and empire abroad are the twin results. At home there has been an ineradicable jealousy of a standing army, and there has therefore been freedom for the development of what Bagehot described as «government by talk.» The navy on the other hand has at most times been viewed with favor, for it has screened the experiments and mistakes by which popular government has been slowly nurtured. These mistakes were often such as would have involved a continental nation in the consequences of a Jena or a Sedan.

Insularity has also permitted of a concentration of purpose upon the sea which was impossible for the other maritime states along the western seaboard of Europe. England succeeded where Portugal, Spain, France and Holland failed, because, in the absence of a land frontier, her economic resources could be focussed on adventure beyond the seas. In this regard it must be borne in mind that sea-power does not rest on the navy alone, but on the co-operation of a mobile army with a dominant navy. An army limited to this subsidiary use has been possible for Britain because of her insularity. By her navy and amphibious army Britain won North America and the sovereignty of the Indies, while France and Holland were involved in continental wars. It was by the exhaustion of her enemies rather than by her victories that Britain achieved her empire. This is surely the truth which lies behind Seeley's famous utterance that Britain had «conquered and peopled half the world in a fit of absence of mind.» Behind her girdle of seas she fought with a limited liability and was immune at home though often defeated abroad.

John Bull's insularity of character is the natural result of his strong frontier. Elsewhere the types of humanity merge gradually where political frontiers are crossed. In some respects this contrast between the British and the continental peoples was in the past even more obvious than to-day. Not only, on the one hand, is the traffic over the seas more frequent now, and Britain's isolation in time of peace less marked, but on the other hand, the change at the conventional continental frontier has been emphasized owing to the centralized character of the modern great state. Ever since the days of the first Edward, the Englishman has felt himself a foreigner from the moment that he landed at Calais or Boulogne.

2. Shallow Surrounding Seas.— The British Isles are the emergent portions of a great shoal known as the Continental Shelf, which stands out seaward from the mainland coast. Precisely as waves grow taller until they break on the foreshore, so the tides, which measure in mid-ocean only some two or three feet in amplitude, are magnified several fold as they pass on to the British shoal. Strong currents are thus generated as the wide British seas alternately deepen and drain low. Cæsar bore eloquent testimony to the influence of our tidal currents in the defeat of his strategy. The British tides, however, have had a uniting as well as a disuniting influence. Streams and streamlets whose mouths in other parts of the world would be mere creeks without fame, in these seas bear the historic names of Thames and Severn, Rhine and Seine. Even in the days of steam motive power, the flow and ebb of the Thames to and past London are worth much money annually — a fact which is one of the chief arguments against the scheme often proposed for erecting a dam below the metropolis and so keeping the water permanently high. What the tides were in the days before steam is evident from the position, many miles from the open sea of such ports as London, Antwerp and Hamburg.

Nor must it be forgotten that the shallow seas around Britain are exceptionally productive of fish. The fishermen of Holland became the carriers from Lisbon to the Baltic, and when Lisbon fell temporarily under the power of Spain, these same Dutchmen extended their voyages to the Indies. To-day, however, the fishermen of England and Scotland are in a great majority on the international fishing grounds of the North Sea, and their powerful steam fishing vessels extend their operations as far as Iceland on the one hand and the coast of Morocco on the other. It is an important fact for a state whose power is on the sea that there are no fewer than 100,000 English, Scotch and Irish who earn their living wholly or in part by sea fishing.

3. Neighborhood to the Continent.— Britain would have had small significance in the world had her position been distant from the historic shores of Europe. It is of course true that the ancient writers from Virgil to Shakespeare are full of the remoteness of Britain at the end of the known world. It is true also that until a relatively late period in history Britain did not count among the powers which shaped the destiny of mankind. These very facts however have enabled Britain to play a part in the last two or three centuries which is comparable to that played by the Greeks on the smaller stage of the earlier time. Because of her neighborhood to Europe, Britain was deeply and repeatedly influenced from several distinct quarters, yet because of her insularity was never permanently attached to any one centre of European culture. It has been Britain's function to amalgamate the several elements of European civilization, and then to spread Europe to all the shores of the world. At least four streams of blood — Neolithic, Celtic, Roman and Teutonic — and four linguistic influences, all drawn from across the narrow seas, have gone to the making of modern Britain. Yet the Englishman of to-day differs generically from all the species of continental European. Britain has been and is *of* Europe yet not *in* Europe.

From this point of view it is important also to notice that the hilly parts of the British Isles are in the north and the west — toward the ocean that is to say, not toward the Continent. As a result, the agricultural England of the plain, the dominant partner in the United Kingdom, lies toward the channel, and London is close neighbor to Paris and the Netherlands. History would have been far other than it has been had the hills been in the southeast and the plains in the north and west.

4. Relation to the Chief Linguistic Frontier of Europe.—A glance at a map of Europe showing the areas occupied by the several languages would make it clear that the most important linguistic frontier, that between the Romance and Teutonic tongues, traverses Europe diagonally from the Alps, and comes down to the coast in the northern corner of France, within sight of Dover Castle. England has received from the Rhine, the Elbe and the Norwegian fjords her Teutonic language and the rudiments of her free institutions, while she has taken from the Seine, and from the western Mediterranean beyond, her Christianity and her scholarship. Scandinavia on the one hand and Spain on the other possess a geographical separation almost as definitely secure as that of Britain, but Scandinavia is Teutonic and Spain is Romance. Britain has been cross-fertilized from both sources.

Moreover, Britain has re-acted upon the dual Europe with the power due to her position. If the adjoining Continent, with its greater population and greater aggregate wealth, had been united politically, the independence of Britain would have been impossible. As Mr. Peel has shown in his article (see GREAT BRITAIN — FOREIGN POLICY IN RELATION TO EUROPE), we have at most times used our power to defeat every bid for general European dominion. Rome conquered a large part of Europe and she also subdued Britain. Napoleon's aim was to invade England, and England only defeated him by overthrowing his European empire. The task of holding Europe disunited has been facilitated in every age by the fundamental antagonism of Roman and Teuton. Britain's immediate neighbors across the Channel, to-day, as in the time of Napoleon, of Louis XV, of Louis XIV, and of Charles V, are on the Rhine and also on the Seine. In the same connection let us note that in the year 1066, at Stamford Bridge and at Hastings, England exchanged, as Dr. Hodgkin points out (THE CONQUESTS) in this volume, a period of Teutonic for a period of Romance influence.

5. Climate Determined by Oceanic Winds. — Britain lies further north than any other country of equally old civilization. Great Britain occupies almost precisely the same latitudes as Labrador. The prevalent westerly wind from the Atlantic, and the set of the Atlantic waters from the tropical southwest carry the warmth and moisture of lower latitudes into a great climatic bay over Britain, in which long frosts and long droughts are equally rare. Unlike either the south or the east of Europe, there is labor in the fields at all seasons, for

Britain has neither a Mediterranean summer nor a Russian winter. May not the moral effect of this continuity of effort account for some of the socalled Anglo-Saxon characteristics? Yet the mists of the oceanic air and the long northern nights are often as unfavorable to repose in the open as the other conditions are favorable to work there. Hence a second Anglo-Saxon characteristic, the home 'round the fireside.

Nor, it must be remembered, is climatic control limited to agriculture and domestic conditions. There are splendid waterways in the wide plains of eastern Germany and Russia, but navigation is there intermittent owing to the long grip of the winter frosts. The rivers of Spain and Italy have abundant volume after the rains and the thaw in the mountains, but they are reduced in the summer to strips of pebble desert. The smaller waterways of England, closed neither in winter nor summer, were long ago made navigable by means of locks.

6. Internal Natural Divisions.—Britain is divided into the two islands of Great Britain and Ireland. The same causes which have separated British conditions as a whole from those of continental Europe have of course tended to separate Irish conditions from those of Great Britain, but they have acted with less effect, because Britain by her position has been driven to obtain sea power, and thus for many purposes to remove her frontiers from her own coast to the coasts across the water. Thus Ireland has been strategically enveloped by England, yet because adequate English manpower was lacking in the time of Henry II, Queen Elizabeth and Cromwell, was never completely assimilated to England. Ireland conquered and necessarily conquered, by England, is in the position that Britain would be in if there were a united Europe across the Channel. Had Ireland been an organized kingdom in the early Middle Ages, instead of a group of rival and hostile tribes, she would have supported Scotland against England, would have retained her independence longer, and when modern conditions rendered union inevitable, would have come into the sisterhood like Scotland as an organized force capable of holding her own.

What every map does not show, however, is the coherent area of bleak uplands occupying the centre of the length of Great Britain, and dividing the agricultural lowland of England from the smaller lowland of Scotland. This upland area has no single name, but is known in different parts as the Southern Uplands of Scotland, the Cheviot Hills, the Pennine Moors, and the Lake Mountains. Until a century and a half ago it had but a sparse population, and was in fact a broad natural frontier between the England of London and the Scotland of Edinburgh. This «border,» utilized by a people of Teutonic tenacity, was the geographical position from which Scotland for six centuries held at bay the superior might of England. Not a little of the effect of modern British action in the world is due to the interaction of the two national characters thus evolved in antagonism.

The central uplands of Great Britain between England and Scotland are now the seat of great industries, and for most purposes the two countries form a single economic organism. But in the Highlands of Scotland on the one hand, and in the broad upland of Wales on the other, a remnant of Celtic speech still survives. In all parts of the world there is a marked contrast between the highlander and the lowlander, but this contrast is here increased by that between Celt and Teuton. Formerly marriage was between neighbors, and provincialisms were inbred. But modern facilities for communication lead to distant intermarriages, which are rapidly imparting a national solidarity of blood to states like Britain. This crossing of highlander and lowlander, Celt and Teuton, within Britain must be productive of a change in the race which may prove something far other than the mere striking of an average.

7. Adequacy of Economic Bases.—All the proceeding advantages — insularity, shallow surrounding seas, continental neighborhood, linguistic division among rivals, soft climate and internal stimulative contrasts — would, however, have been of little value unless Britain had had length and breadth enough to supply the economic bases for a people able to count among the powers of Europe. It is therefore important to note on the map of Europe a certain rough equality as between the great natural regions — the Spanish, Italian and Balkan Peninsulas; the plain of the Middle Danube; the French land between the Alps, the Pyrenees, the Bay, and the Channel; the north German plain; and the southern habitable portion of Scandinavia. Even the vast Russian plain, after all only partially European, must not deceive by the space which it occupies on the map. North and east of the great bend of the Volga at Kazan it contributes little to the strength of the Russian people. Many advantages and disadvantages, moreover, compensate for such differences of mere area in this bundle of natural regions which we call Europe. Thus there is a rough equality of resource among the tenant nations, and this has sufficed for a balance of power during several centuries.

Until within the last few generations agriculture was the chief economic base of these nations. For the reason given just now — the separation of their agricultural plains — England, Scotland and Ireland were separate economic organisms. Relatively to her population, England was until lately so adequately endowed with land that in the Middle Ages she was the principal exporter of wool, and in the 18th century, of wheat, to the Continent of Europe. The vast improvement of agriculture achieved by the English farmer in the 18th century was one of the chief causes — if not the chief — of the wealth which enabled England to defeat Napoleon. (See GREAT BRITAIN — AGRICULTURE IN THE 18TH CENTURY, by Dr. Knowles).

Though agriculture still remains the greatest single industry, yet by the aggregate of her industries Britain is now an industrial rather than an agricultural country. In other words, she rests on her output of coal rather than of wheat and meat. The change has, however, been fully accomplished only in the last two generations.

The new economic conditions have been variously influenced by geography. In the first place Scotland has been effectively united to England. The barren uplands in the north of England — in the isthmus, that is to say, connecting the two countries — are rich in coal, and a population has grown up in this part of the island drawn both from Scottish and English sources, and of an intermediate character. Moreover, Scotland, by virtue of her own coal, has been able to share in the advantages of the imperial and economic policies of England. At the time of the union of the two parliaments in 1707 Glasgow was only a village.

The dominance of the trader over the farmer led in the 19th century to a reversal of the long-settled British policy of protection. England and Scotland no longer rest economically on the resources of their own territories. They produce coal, and are the seat of labor and of capital, but four-fifths of their wheat they import, and one-fifth of their people are engaged on manufactures for export. Ireland, however, has very little coal, and must still depend on her agricultural products. Thus, while Scotland and England are now a single economic organism, Ireland — with the exception of Belfast — is another and separate organism. There is an antagonism of economic interest between Ireland and Great Britain which may be compared to the antagonism of interest between the Southern States and the Northern before the Civil War. If in her own interest Great Britain were to revert to her former economic policy, an incidental result in the long run might possibly be to reconcile Ireland to her.

8. **Geographical Momentum.**— We must not however seek to ascribe the present strategic and economic position of Britain in the world, in so far as it depends on geographical causes, wholly to the present action of those causes. There is such a thing as geographical momentum. The causes which originally led to the establishment of a market in a given place may have ceased to act, but the habit of the customers will long compel salesmen to resort to it. London at the present moment is the greatest general store in the world. It has no staple industry, but parcels of almost everything manufactured in other parts of Britain, and, indeed, in almost all parts of the world, are warehoused there. Except for large quantities of staple goods, many smaller communities find it convenient to give their orders and to make their payments in London. Formerly, no doubt, as Emerson has said, England as the great shopkeeping nation had a good stand in the world. Her chief customers were along the European coast opposite. But now part, at any rate, of her influence is due to momentum from the past, to the start given to her during the Napoleonic wars, and by the fact that in the days before railroads she had coal near the waterways.

9. **The Consequences of Sea Power.** — Britain now lives in part on the products of her own land and seas, in part as a manufacturer for other countries, and in part as a market. But she also obtains profit from her position as the chief sea power. By this power she prevents her enemies from uniting, she retains certain open markets, and she protects her carrying trade. Sea power, however, is a condition of the existence not only of the British Empire, but also of the United Kingdom. This was early made evident. When Edward the First conquered the Principality of Wales, he moved the fleet of the Cinque Ports, then the only fleet available for the English king, into the rear of his opponent. This he could not have done had not the Lord of the Isles been defeated shortly beforehand by the Scotch. For several previous centuries sea power along the oceanic borders of Britain had been in the possession of a Norse state established in the fringe of islands which extend round the west of Scotland from the Shetlands to the Isle of Man. Unless Britain has command of her seas the Shetlands and the Orkneys, and indeed Ireland itself, might he held by the foreigner against her, and the foreign invader might establish his bases even in the remoter peninsulas, say of Scotland or Wales. It was from such a peninsular base at Lisbon that Wellington conducted the war against France at the beginning of the 19th century.

The very need of sea power, or in other words, of the sea itself, renders it impossible to put territorial limits to naval action. Britain can command in the British seas only if she can also command in waters more remote. Her fleets are now concentrated in European waters because her possible naval opponents are there to be found, and for no other reason. It follows, however, that Malta and Gibraltar, the bases of the Mediterranean and Atlantic fleets, are in reality not merely milestones on the road to India, but also outposts for the defence of London. It is this characteristic of sea power, now familiar to all the world through the writings of Admiral Mahan, which renders it necessary for modern Britain — faced by powers that rest upon half continents — to extend her economic bases beyond her original insular territory. Whether this is to be done by the method of increasing the insular factories and holding open the over-seas markets, or by such a federation with her colonies as will in effect base her navy on the agriculture and factories of a wilder land, is yet the issue of British politics — the outcome of many centuries of history in an insular and yet European geographical environment.

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2. THE CONQUESTS. Two, at least, of the great inrolling waves of conquest, which have left their mark on the people and the institutions of Britain, had spent their force before any historian arose to record them, and are thus for us like the forgotten events of our unconscious childhood. As to these we can only speak darkly and doubtfully according to the scanty evidence furnished by excavations of the barrows in which the bones of Prehistoric Man are laid. Judging from these, we are able to say that in the dawn of the history of Britain, our island was inhabited by a race ignorant of the use of metals, of the manufacture of pottery, and of the art of weaving, but accustomed to the use of stone implements such as wedges, axes and hammers, which they fashioned with considerable skill. This race is one of those called Neolithic, to distinguish them from the incalculably older races of Palæolithic Man, who also used stone implements, but who lived before that mighty parenthesis in human history which is called the Great Ice Age. What the Neolithic inhabitants of Britain may have called themselves we are utterly unable to say. For convenience they are generally spoken of as Iberian, in order to indicate a possible connection with the aboriginal inhabitants of Spain, now represented by the Basques; but this connection is only an ethnological guess and must not be taken as an established fact. The race in question buried their dead in long barrows, the excavation of which shows that they were of short stature, with skulls tending to the long rather than the broad shape (Dolicho-cephalic rather than Brachy-cephalic) and that they were probably black-haired and of dark complexion.

To these aborigines of Britain entered two tall and fair-haired races, both of them probably belonging to that great family of nations which we call Celtic. The first of these invading races wielded weapons of bronze; the second was acquainted with the use of iron, and this may account for their victory over their predecessors. At present the tendency of scholars is to identify the bronze-using people with the Gaels (or as they are now generally termed the Goidels), who have left their chief mark on the populations of the Scottish Highlands, of Ireland, and of Gaul. The wielders of iron would be the race (now called Brythonic) which gave its name to Britain; which occupied the greater part of the southern half of the island when Cæsar landed; which survives under the name of Cymri in the mountains and valleys of Wales; and whose language, once spoken in Cornwall and Cumberland, is the dearest possession of the eloquent Welsh and has a large currency among the peasants of Brittany. As to the date of these several movements accurate information entirely fails us, but it is probable that several centuries elapsed between the arrival of the two waves, the Goidelic and the Brythonic, and that all had been accomplished several generations before the birth of Christ.

It was in the year 55 B.C. that the Roman eagles were first seen on this side of the straits of Dover. Whether Julius Cæsar seriously contemplated the conquest of Britain, or whether his two expeditions in that and the following year were only theatrical performances meant to overawe the tribesmen of Gaul and to dazzle the populace of Rome, is a question not easily answered. It is certain that, if an abiding conquest was his aim, he had greatly underrated the difficulty of the task. His own narrative, much more candid than that of most generals who indite their own bulletins, shows clearly that neither expedition was really successful, that the Britons fought well, that the dense forests of their land, and the chopping tides of their seas powerfully aided their resistance, and that Cæsar himself, after the midsummer of 54 B.C., never desired any closer view of the white cliffs of Britain.

But though Cæsar was foiled, Rome remained and was still the world-conquering city. In the year 43 A.D. when Claudius was Emperor of Rome, an expedition was fitted out for the conquest of Britain. The commander was the high-born senator Aulus Plautius, and he had under his orders four legions with a proportionate number of cavalry and "allies." The latter were for the most part armed more lightly than the legionaries and were generally stationed in the wings, while the legionaries fought in the centre. The total number of Plautius' soldiers cannot have been less, and may have been considerably more, than 40,000. For 17 years no serious misadventure hindered the onward progress of the Roman arms, though the Silures of South Wales, under their king, Caratacus, kept the invaders at bay for many years. In the year 59, however, we find the Roman general Suetonius Paulinus crossing the Menai straits and conquering Anglesey, and the Roman soldiers quartered at Chester and at Lincoln. Then came (60) a terrible reverse of fortune, the only serious set-back to the Roman career of conquest in these early centuries. Maddened by the tyranny of a grasping Roman official, Boadicea, queen of the Iceni (a tribe inhabiting what is now the county of Norfolk), called her countrymen to arms, sacked the Roman colony of Camulodunum (Colchester) and the cities of Verulamium and Londinium, and threatened to root the Romans out of the land. Suetonius, however, hastened back into the centre of the island and there, giving battle to the far more numerous forces of the barbarians, achieved a decisive victory.

After this the Roman frontier was pushed steadily forward, especially by the famous general Julius Agricola (78–84) till it nearly coincided with that which is now the northern boundary of England. About the year 120 the Emperor Hadrian is believed to have built that noble stone wall from the estuary of the Tyne to the Solway, of which important fragments still remain, forming one of the most interesting memorials of Roman domination north of the Alps. Another wall, of turf, was drawn by Hadrian's successor, Antoninus Pius, across the lowlands of Scotland from Forth to Clyde, but it was probably not maintained for long as a boundary of the empire, and the hold of the Roman legions on any part of Caledonia was always precarious. We cannot now do more than briefly allude to the expedition of the aged Emperor Severus, in which he is said to have reached the northern extremity of the island and carefully noted the duration of the long midsummer days.

Notwithstanding many incursions of the barbarians, and the obviously failing strength of the empire, the 3d and 4th centuries were probably not on the whole calamitous times for the now reconciled and submissive inhabitants of Roman Britain. At last in 383 a general named Maximus rebelled against the Emperor Gratian, assumed the purple robe, and carried his legions into Gaul to enforce his claim. It may be doubted whether the wealthy and timid provincials ever slept soundly after that fatal departure. True, the rebellion was in course of time suppressed, and some portion of the legions struggled back to Britain, but more mutinies followed, Rome itself was in danger from Alaric and his Goths, and at last about 407, the last of the Roman legions quitted the island never to return.

Of the next act in the great drama, the conquest of England by the English, we have hardly any trustworthy information. The broad outlines of the conquest may be traced. Three tribes of the Low German stock from the shores of the Baltic and the North Sea certainly established themselves here in the course of the 5th century. The Jutes settled in Kent and the Isle of Wight, the South Saxons gave their name to Sussex, the East Saxons to Essex, the West Saxons established themselves in Hampshire and Wilts, the East Angles in Norfolk and Suffolk, the Middle Angles in the Midland counties where they founded the kingdom of Mercia. Deira and Bernicia, the two kingdoms which sometime coalesced into Northumbria, were also Anglian settlements: but how and when all these territorial changes took place we really cannot state with certainty. Even the ‘Saxon Chronicle,’ which professes to give dates for the foundation of the kingdoms of Kent, Sussex and Wessex, tells us scarcely anything about Northumbria in these early years, and nothing at all about the other three kingdoms.

The ordinary story of the Saxon conquest is thus told. On the departure of the Roman legions the Britons, sore pressed by the incursions of the Northern and Irish barbarians, the Picts and Scots, called on "Aëtius, thrice consul," for aid which he was unable to give them. Thereupon they foolishly turned to the Saxon and kindred continental tribes for help. Hengist and Horsa, Jutish princes, came at the call, landed on the coast of Kent, repelled the Caledonians, but refused to quit the country after the work of liberation was accomplished. The infatuated passion of Vortigern, the elderly British king, for Rowena, daughter of Hengist, aided the designs of the invaders, who sent over to the continent for more and ever more of their countrymen till the conquest at least of the eastern half of the island was accomplished.

For the story thus told the evidence is not satisfactory. It chiefly consists of the narrative of a Welsh ecclesiastic named Gildas, who lived a century and a half after the legions quitted Britain, and who, though an earnest Christian patriot, was evidently but slenderly furnished with historical knowledge. Nor do the very meagre details of the conquest which are supplied by the ‘Saxon Chronicle’ carry us much further. That Chronicle was itself probably not compiled till three or four centuries after the invasion, though some of the material included in it may be of a much earlier date.

On the whole all that we can safely say appears to be that apparently throughout the 5th century a series of attacks on the Romano-British population was being made by the Germanic tribes which the Romans had known by the name of Saxons. These attacks had begun even in the 4th century and, in order to guard against them, the emperors had created a high official who bore the name of "Count of the Saxon Shore." The invasion may possibly have culminated in the year 449, the year assigned by the ‘Saxon Chronicle’ to the landing of Hengist and Horsa, but there is some reason to think that even that specific event took place eight years earlier. The name of the first West Saxon chieftain, Cerdic, interests us because it is from him that the present royal house of Great Britain derives its origin. His career of conquest, which had been most successful, was possibly stayed about the year 516 by a great victory which Gildas reports the Britons to have won at "Mount Badon." In the present state of our historical knowledge no one can deny that this victory (about which the ‘Saxon Chronicle’ is silent) may have been won by a Romano-British hero named Arthur.

About 60 years later (577) the great victory of Deorham, won by Ceawlin, the grandson of Cerdic, once more carried forward the invading flood and finally separated the Britons of Wales from their kinsmen in the district which was then called West Wales, but which we now know as Cornwall.

The Saxon conquest was apparently never an easy one, and became harder and slower as time went on. By the middle of the 6th century, roughly speaking, the invaders occupied all of England that lies east of a line drawn from Berwick to Portland; but it had taken at least three generations to reach so far. Then came the above-mentioned victory of Deorham and the extension of the Saxon border far into Devonshire. In the northwest during the 7th and 8th centuries, the Northumbrian kings cut short the British kingdom of Strathclyde, and perhaps reduced it into a condition of something like vassalage. On the Welsh marches, Offa, the great king of Mercia, in the 8th century, carried the western border of England from the Severn to the Wye, and by a substantial earthwork, some vestiges of which still remain and are known as Offa's Dyke, fixed the dividing line between England and Wales almost in its present position. The actual conquest of Wales and its complete subjection to the English kings had to wait till the 13th century, when it was accomplished by Edward I.

The four centuries which intervened between the departure of the legions and the accession of Egbert are generally felt by the historical student as a wearisome interlude in which nothing is done toward the real business of the drama, the creation of an united England. In truth, no thought that such was the real action of the play probably visited the minds of the chief performers. The invaders belonged to various clans, tribes and communities and though they must have spoken the same or nearly the same language, they had only the feeblest conception of duty toward one common country. Even within the limits of the same race we look in vain for any active principle of brotherhood. Angle seems to war against Angle, and Saxon against Saxon, just as cheerfully as either would war against the other. It is true that the moral conquest which lies outside the scope of this paper, the conversion of the English to Christianity (600–686), did something toward quickening the sense of national unity; but notwithstanding the Church's influence, this was still weak when Egbert ascended the West Saxon throne, nor can he, notwithstanding the ascendency which he exercised over the other still subsisting kingdoms, be regarded as truly king over all England. It was the terrible Danish invasions and the fact that only one champion, the hero king of Wessex was found able to resist them, which finally established the unity of Anglo-Saxon Britain under the rule of Alfred and his descendants. We call the new invaders, for convenience sake, Danes, but in truth they came not only from Denmark, but from Norway, perhaps from all the harbors of the Scandinavian seas. In 789 the Danish storm began to blow, and with one or two lulls, it blew for three centuries, till Harold Hardrada lay dead on the field of Stamford Bridge. In the year just mentioned (789) three Danish ships appeared off the coast of Devonshire. The mariners resisted the attempt of the king's steward to levy toll upon them, slew him, and sailed away. Four years afterward came another and more deadly invasion. «The heathen men,» says the Chronicle, «miserably destroyed God's Church at Lindisfarne, with rapine and slaughter.» This ravage of one of the holiest places in Western Christendom showed the savage heathenism of the invaders and struck terror into the hearts of noble and peasant alike, who saw that no sanctuary could be of any avail when the terrible raven standard of the Danes was flapping in their harbors.

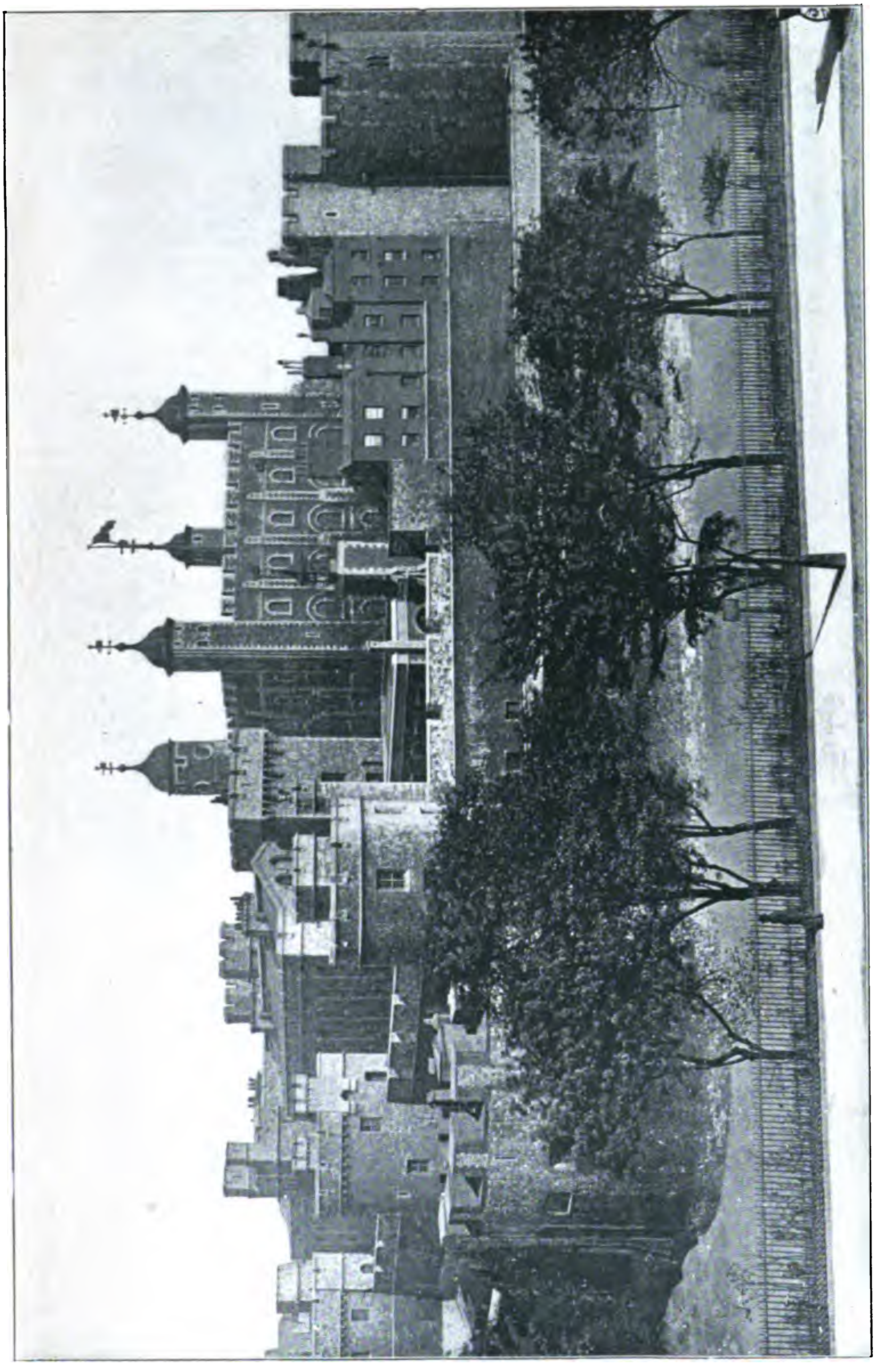
The usual course of one of the early Danish invasions was something like this. When spring days dawned a little fleet of ships, or rather long boats, undecked, with one mast in each, and seats for 60 rowers, would push off from the Danish or Norwegian coast and appear in English or French waters. (It must be remembered that France and Germany suffered almost as severely as England from the Danish ravages). The mariners steered their barks into some estuary, such as that which then severed Thanet from the mainland, and leaving them there under a sufficient guard, spread themselves over the country in quest of horses. When they had thus mounted themselves at the expense of the victim country, they made rapid excursions far and wide over the land, burning towns, plundering monasteries and churches, fighting with and generally defeating the *ealdorman* or lord-lieutenant of a county, who at the head of his rustic militia (*fyrd*) came forth to fight his brave but stupid battle of defense. Their enemies accuse them of inhuman crimes: the torture of prisoners, the violation of women, the mirthful slaughter of little children; but there is some doubt how far these atrocities can be fairly taken as typical of the general character of the Danish invasions. Of one feature of these invasions there can be no doubt: that is, of the special hostility which they displayed to the churches and monasteries of Western Europe. The historical literature of our country has probably to lament the loss of priceless manuscripts, especially in the convents of Northumbria and Mercia, caused by the ravages of the Danes.

When the summer was drawing to a close, and when the long boats were gorged with the plunder of half a dozen counties, the unwelcome intruders would return to their ships, glide away out of the channel in which they had cast anchor, and for that year the harried and wasted land would see them no more. This, at least, was the case in the first stage of the invasions, for about 60 years after the sack of Lindisfarne. Then, in 851, as the Chronicles tell us, «the heathen men settled themselves over winter in Thanet.» From that time the invasions of the Danes assumed a more and more permanent character: from mere freebooters they became conquerors: Northumbria and Mercia were bound to their chariot wheels, and the whole of England would have been subjugated by them but for the war of liberation which was successfully waged against them by Alfred the Great (871–900).

Though Alfred broke the Danish yoke, and although his son and grandson, Edward and Athelstan, triumphantly asserted the supremacy of the English crown over the Danish chieftains who were left in the land, the result of the warlike operations of the 9th and 10th centuries was to cause an immense infusion of Scandinavian blood into the population of England. The Danelaw, as it was called, included the greater part of the country northeast of the Watling street, the old Roman road which ran from London to Chester; and in many parts of this region, notably in Lincolnshire and the East Riding of Yorkshire, the names of places still bear witness by their terminations to the existence there of a large number of Danish settlements. It cannot be doubted that this Scandinavian element when subjected, as it soon was, to the humanizing influence of Christianity, was a most valuable and virile ingredient in the population of England.

Through the greater part of the 10th century the Danish inhabitants of England were kept under by the strong hand of the English kings, and the Danish invasions nearly ceased. Near the end of that century they were resumed, and owing to the portentous weakness of Ethelred and his counsellors, they achieved a greater measure of success than ever before. An archbishop was martyred; six successive payments of tribute were paid in the vain hope of inducing the invaders to cease from ravage; and finally the descendants of Cerdic had to quit the realm, and Canute the Dane sat upon the throne of England. As king, however, the Scandinavian conqueror healed many of the wounds which his countrymen had inflicted as ravagers; and the long and prosperous reign of the Christian Canute marks practically the end of the period during which the Danish pirates were a source of terror to the Saxons. The reign of Canute, however, coincided with one event in the nature of a conquest, not favorable to England. In the year 1018 Malcolm, king of Scotland, won the battle of Carham over the men of Northumbria and thereby succeeded in forcing back the English frontier from the Firth of Forth to the line which it now occupies of the Cheviots and the Tweed. The rich country of the Lothians, which for near five centuries had formed part of the kingdom of Northumbria, was now permanently added to Scotland.

The line of Canute came to a speedy end in the persons of his worthless sons; and thereafter, during the central years of the 11th century, under the reign of Edward the Confessor, there was going forward a peaceful conquest of England by the Normans under favor of the Norman-minded king. In truth there was much to admire in this young Norman race, strong with Scandinavian energy, but refined and liberalized by the memories of Roman culture which still lingered in the shattered empire of Charlemagne. Hard and grasping as the Norman warrior might be — and William the Conqueror was a typical Norman in this respect — he was at this period generally chaste and temperate. His devotion to the Church was not a mere hypocritical pretense, nor was it only testified by the magnificent cathedrals



The Tower of London

which he erected. As statesman, as architect, and as warrior, it must be admitted that the Norman knight much outshone the Saxon *thegns* whom he supplanted.

The peaceful conquest of England by Norman influence which had been for a time arrested by the successful rebellion of the half-Danish family of Godwin was succeeded by the bloody conquest of 1066. Many causes concurred toward this event; the utter feebleness of the representatives of the line of Cerdic; an uneasy consciousness that Harold Godwineson, who had been raised to the throne on the death of Edward the Confessor, was no rightful wearer of the West Saxon crown; the long-lasting feud between his family and that of the sons of Leofric; but above all the grievously ill-timed invasion of the Norwegian Harold Hardrada. It was on an ill day for Scandinavia as well as for himself that he landed with his ally, the traitor Tostig, on the coast of Yorkshire. Unable to conquer England himself, and winning nothing from her king but the seven feet of earth assigned for his grave at Stamford Bridge, he nevertheless left her panting and breathless for the encounter with a mighter and unwearied foe.

By the battle of Hastings, England, which had been for centuries closely linked with Scandinavian interests, was wrenched away from that connection, and was forced to revolve in the same orbit with the Latin-speaking races of western Europe. A revival of the empire of Canute, which had bound England, Norway, and Denmark together, was made forever impossible. The eyes of the English king turned henceforth toward Rouen, Paris, Angers, Bordeaux; the lands of the northeast on the far side of the German Ocean were to him a well-nigh forgotten world.

As a matter of tactics the victory of Hastings seems to have been due to William's skilful combination of archers and cavalry. The English forces, though much more imperfectly disciplined and less inured to war than the Normans, stood well at bay for many hours behind the shield-wall which they knew so well how to weave, but they were galled by the thick-flying arrows of the Normans, and were tempted, by the feigned flight of the enemy, to rush down the hill after them. Then did William's cavalry, galloping up, thrust themselves in between their broken ranks, and throw them into confusion from which they never recovered. Since the 14th of October 1066 no foreign conqueror has permanently established himself on English soil, and we may therefore here close our brief and rapid sketch of the Conquests of England.

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Some light is thrown on the Danish invasions by the Heimskringla (in the Saga Library, edited by Morris and Magnusson), also by Vigfusson and Powell's ‹Corpus Poeticum Boreale.› For the Norman Conquest, the chief authorities are Ordericus Vitalis, the ‹Roman de Rou› of William Wace and pre-eminently the ‹Bayeux Tapestry,› edited by F. R. Fowke, London. Modern writers on the subject are too numerous to mention here, but reference may be made for the Roman period to Mommsen's ‹Provinces of the Roman Empire,› (Vol. I of the English translation), and F. Haverfield's contributions to the Victoria County History of England.

For later history it will be sufficient to refer to J. R. Green's ‹Making of England› and ‹The Conquest of England,› to E. A. Freeman's ‹Norman Conquest,› to Sir James Ramsay's ‹Foundations of England,› and to C. F. Keary's ‹Vikings in Western Christendom.› But for the whole subject of the bibliography of English history from the earliest times to the 15th century no better guide can be found than ‹Sources and Literature of English History,› by Charles Gross, of Harvard University.

THOMAS HODGKIN,
Author of ‹Italy and Her Invaders,› ‹Life of Charles the Great,› ‹Political History of England› (Vol. I), etc.

3. MEDIÆVAL ENGLAND. The foreign invader had finished his task when the last results of the Norman conquest of England were slowly worked out during the Norman and Angevin periods. For the future the development of the country was to depend upon resources supplied from within. The first stage in this new growth is marked by the reigns of Henry II and his sons. From one point of view Henry II's work was but a continuation of that of his grandfather, Henry I. Recent investigation has shown that few of the characteristic features of Henry II's policy were specifically his own, and that he never departed far from the lines laid down by his grandfather. Yet the use Henry made of the materials thus provided for him constituted a new departure in our history. Dr. Stubbs' well-known description of Henry's reign as a "period of amalgamation" remains as true as ever. Before his days, the English and Norman peoples and English and Norman institutions remained separate, though side by side. It was the mission of the Angevin despotism to grind down both English and Norman into a common nation with a common set of institutions. At first the process was a mechanical one, for the combination was due exclusively to the will of an absolute monarch, working through the most effective administrative machinery which mediæval times had up to now witnessed. As long as the Angevin despotism remained intact, the English and Norman races and institutions continued to be kept together through this external pressure. But they became accustomed to the new conditions, and when the system of Henry II, which had survived the neglects of Richard I, broke down through the active tyranny of John, the union had become organic to such an extent that it continued, despite the relaxation of the severe pressure which had brought it about.

The most permanent feature of Henry II's work lay in the establishment of the unity of England, and the control of the country by a unified administration dependent upon the central power. Though the upper classes long continued to speak French and to bear French names, they became as English in spirit as their native-born tenants and vassals. Yet neither Henry nor his subjects had any consciousness of the results of his work. Henry selected England for more treatment than he devoted to the rest of his dominions, not because he was an English patriot, but because circumstances gave him greater control over his English kingdom than over any other part of his extensive territories. His own personal ambition was rather to build up a cosmopolitan Angevin empire, than a national English kingdom. This ideal could not be realized because it brought his house into direct conflict with the growing monarchy of France, whose kings were engaged in carrying out over their dominions similar work to that which Henry had accomplished for his island kingdom. With the falling away of Normandy, Anjou, and Poitou from John, and their absorption into the monarchy of Philip Augustus, the Angevin empire collapsed. Henry II's continental possessions had contributed next to nothing toward the development of England, but the work he had accomplished in unifying them had materially smoothed the path by which the French national state was to attain to greatness. The retention of Gascony in the hands of the English kings kept up the friction between the two nations and brought about that hereditary enmity of France and England, which was so characteristic a feature of all later mediæval history. Thus the failure as well as the success of the Angevin rulers had their permanent importance. This was even more notably the case with other aspects of Henry II's policy which may be described as premature rather than as impossible. Conspicuous among these were the efforts of Henry II to enlarge the English kingdom into a monarchy over all the British islands. The conquest of the more fertile parts of Ireland by Anglo-Norman feudal adventurers set up in that island the uneasy dependence of a Celtic people on the English King's feudal vassals which had already been established in southern and eastern Wales since the days of Henry I. Side by side with this, something like a Norman conquest of Scotland was affected, not so much by the enforced recognition of English supremacy by unwilling Scottish kings, as by the gradual infiltration into the northern kingdom of the system and habit of thought which had gained the ascendancy in Henry's own realm. Even the least successful of Henry II's efforts was not without influence on the future. After the martyrdom of Saint Thomas of Canterbury, Henry II renounced as hopeless any heroic attempt to limit the sphere of the jurisdiction and authority of the Church. Yet his watchfulness in controlling and regulating what he deemed the usurpation of the clerical power was renewed from time to time by the more strenuous of his successors, and finally attained a full triumph in the period of the Reformation. For all these reasons, the reign of Henry II is among the most pregnant of future consequences in all British history.

The personal prowess and contemporary fame of Richard I cannot blind us to the insignificance of his reign in results. His brother, John, was the worst and most unlucky of English kings, but the consequences of his failures and blunders determined the whole future course of English history. John's unsuccessful conflict with Innocent III emphasized that triumph of the Church, which even his father had been unable to prevent. The break up of the Angevin empire, though precipitated by his caprice and neglect, was sooner or later inevitable. More important than either of these was the reaction against his domestic authority, which resulted in the union of barons and people in an effort to limit the autocracy of the Crown. The Angevin despotism had done its best work in bringing about the union of England. Like all despotisms, it was a bad thing in itself, even when necessary as the only alternative to feudal anarchy. In John's capricious hands it did not so much as secure the continuance of the law and order for which England had long been willing to pay a heavy price. When the mass of the English people, abandoning their traditional devotion to the monarchs who had saved them from feudal disorder, united with the baronial leaders to wrest from the unwilling king the grant of Magna Charta, the first faint beginnings of English liberty and constitutional government were already at hand.

Of recent years it has become almost the fashion to decry the importance of Magna Charta. It is easy to see that John, in sealing the charter, thought of nothing but obtaining a momentary respite, and repudiated his act as soon as he found it safe to do so. It is equally patent that the barons who forced John to accept the charter were mere feudalists, careless of all but their personal wrongs and the grievances of their class, and quite unconscious that they were acting otherwise than their ancestors had always acted. Yet emphasizing the unworthiness of these men should not blind us to the significance of their work. However unconscious they were of their high mission, the Fitzwalters and the Vescys were in a very real sense the pioneers of English liberty. The opportune death of the tyrant, the withdrawal from England of the barons' dangerous ally, Louis of France, and the wisdom of the papal legate, Gualo, who accepted in the name of his ward, the infant Henry III, the charter which John had repudiated, insured the permanence of their principles. For nearly a century the great event of English history is the struggle for the charter. Under the long minority of Henry III the ideas of limited monarchy and constitutional control, which were its essence, had time to assert themselves. When the young king attained manhood, his personal weakness made impossible any effective attempt on his part to carry on the government on autocratic Angevin lines. The aristocratic control of the administration was now secured, though it was long before that control was vigorous or effective. The chief danger to England was that the nobles in resuming their former power might also have fallen back on the old separatist ambitions of their feudal ancestors. Luckily the reaction toward feudalism was slight and easily suppressed. The baronage of Henry III's reign was a very different body from that of Norman times, and only a few isolated individuals still cherished the ancient feudal ambition of each nobleman ruling like a king over his own hereditary estate, and caring nothing for the manner in which the central government of the country was carried on. The barons of the 13th century accepted the unity of England, and accepted the central administration which the Norman and Angevin kings had built up. Their chief concern was to see that the government of the country was under their own control, and not regulated by the king's despotic caprice. Thus the unity of England remained, but the central government was henceforth an aristocracy rather than an autocracy. The barons claimed to be the hereditary counsellors of the Crown. Even a strong king was compelled to frame his policy to their liking, and to admit them into a sort of partnership with him. Under a weak king, like Henry III, the barons aspired to rule the realm as they would. Their moment of triumph came in 1258, when the Provisions of Oxford transferred the administration of the country from the monarch to a committee of 15 barons, without whose counsel and consent the king was not permitted to take any action. Thus the Angevin despotism developed into the constitutional monarchy of later times, though at this stage the only effective limiting force was the baronial aristocracy. Side by side with this constitutional development was the blossoming of every aspect of mediæval life, and which made the 13th century one of the most brilliant periods of English annals. The age of Henry III witnessed the consummation of Gothic architecture; the beginnings of the most spiritual aspects of mediæval Christendom in the orders of mendicant friars; the rise of a new intellectual life in the scholastic philosophy, and the organization of teachers and scholars, called universities. For a long time the political weakness of the reign of Henry III checked the general progress of the nation, but with the revolt of the barons a new political development began.

The purely baronial conception of the English Parliament had hardly been formulated when its inadequacy became self-evident. Even in Norman and Angevin times the authority of the Crown had been largely based on the mute but hearty support which the average Englishman gave to the one power which could maintain order, and save him from the caprice of the local feudal tyrant. The machinery by which this popular backing of the royal authority had been effected still survived in the popular local courts, and the jury system of Henry II had enlarged the representative principle by affording facilities for representative committees of the shire moots to treat directly with the king or his agents. Administrative convenience and financial necessity brought about during the first half of the 13th century a further extension of the idea of representation. It became not unusual for knights, representing the shires, and burgesses, chosen from the boroughs, to be gathered together in a single assembly to voice complaints, frame laws, testify to ancient customs, and make extraordinary grants of money. Such was the state of things when the narrowness and selfishness of the triumphant baronial oligarchy provoked a strong reaction among their own more enlightened supporters, and gave a unique chance to the broader-minded friends of the monarchy to rescue it from the impotence into which it had fallen. Simon of Montfort, Earl of Leicester, made himself the leader of the former; Edward, the king's son, the future Edward I, put himself at the head of the latter movement. The momentary triumph of Earl Simon over both his baronial colleagues and his royalist enemies was marked by the Parliament of 1265, which, if not the "first House of Commons," was at least the first occasion when the new machinery of representation was applied to the determination of grave political issues. The effect of Simon's work was that the lesser landholders and the citizens were called upon to enlarge the narrow circle which had hitherto alone aspired to control the crown. Though Simon perished within a few months on the field of Evesham, his enemy and supplanter, Edward I, carried on and completed the work. Edward was every inch a king, and loved power too well to abandon any of it willingly. But he dreaded the might of the greater barons and of the still independent Church; he appreciated the advantage of having the people on his side; and he was the first king after the conquest who was in a real sense an Englishman. Up to now the progress made in England had been on lines common to all Christendom. There is nothing specifically English in the Church, the friars, Gothic art, scholastic philosophy, the universities, feudal warfare, or even in the system of representative control of the Crown by the estates. At last under Edward I a newer and more specially national note is sounded. Under this great king the constitutional system became perfected; the council of the nation became permanently strengthened with a popular and representative element; the baronial parliament was enlarged with the three estates of barons, clergy, and commons. Edward I was even less of an innovator than Henry II, but old ideas took new shapes under his direction. The materials of the Constitution had been supplied during the creative period of the barons' wars. His work, as Stubbs has truly said, was a work of definition. Henceforward the main outlines of the Constitution were clearly marked out and defined. As far as outward forms went, they remained as Edward established them, until quite modern times.

The most permanent result of Edward I's work was the creation of the English parliamentary system. Edward's other ambitions were less completely realized. He aspired, with but little success, to maintain his position in Gascony and on the Continent against Philip the Fair, the greatest of the mediæval Kings of France. He aimed at playing a prominent part in Europe, and checking the ever-growing usurpations of the Church in the political sphere, and at establishing his authority over all the British Islands. In most of these directions he was not very successful, except that by the destruction of the state of Llewelyn of Wales he made the English monarch supreme over southern Britain. Even in his lifetime his attempt to absorb Scotland showed no great prospect of success. Under his unworthy son, Edward II, Robert Bruce's great triumph at Bannockburn (1314) secured the independence of Scotland and made permanent the division of the English race into two unequal halves. So far as concerned internal politics, the reign of Edward II seemed marked by an equally strong reaction. The Lord Earl Ordainers and their leader, Thomas of Lancaster, take us back to the oligarchical atmosphere of the Provisions of Oxford. It was only after their fall that the Despensers identified the triumphant monarchy with the representative parliamentary system. The revolution of 1326, which cost Edward II his throne and his life, perpetuated the constitutional authority of the estates. During the long reign of Edward III, the king's foreign preoccupations made it essential for him to keep on fair terms with his subjects. The subsidies and support, necessary to enable Edward III to carry on the early stages of the Hundred Years' War with France, finally consolidated the constitutional fabric and ensured its permanence.

England had already became a nation under Edward I. During the reign of his grandson Edward III the might of the English state was revealed to all Europe by the extraordinary military successes which laid low the ancient feudal fashion of fighting in famous battles such as those of Crecy and Poitiers. It was now that the English king first aspired to be lord of the seas, and that English mariners and wool merchants prepared the way for the industrial England that was ultimately to supersede the military state that now claimed a great place in the affairs of Europe. It was the age of Chaucer and Wycliffe, when the English tongue and English literature blossomed anew, and when the new nation became impatient of the narrow limits and strict restraints of the mediæval fashions of life and thought. It was in this age that the Church first provoked successful opposition, and first manifested signs of conscious weakness. The ravages of the Black Death, the direst of mediæval pestilences, undermined the old social order and prepared the way for all that ultimately differentiated the social and economical system of England from that of its continental neighbors. Chivalry, whose deeds were glorified in the pages of Froissart, was threatened with decay at the moment of its apparent triumph. The brilliant successes of the French war were succeeded by disastrous failures. In his embarrassed old age Edward III saw the loss of his foreign conquests, and the undermining of his authority at home. During the troubled reign of his grandson, Richard II, the economic troubles of the period culminated in that Peasant Revolt of 1381 which, even in its failure, was to ring the knell of villeinage and the old social system. As Richard attained manhood, he ventured upon the most serious effort made by a later mediæval king to overthrow the constitutional system, and strove to make himself an autocrat like his ancestors and his contemporaries, the French kings. His boldness drove him from his throne to a prison where he soon met his fate. With the Revolution of 1399 England was brought back permanently to the constitutional path.

The Revolution of 1399 was a conservative reaction in at least two directions. It restored the old parliamentary Constitution and insured the loyal continuance of a limited monarchy by establishing on the throne with a parliamentary title that house of Lancaster, which since the days of Earl Thomas had almost continuously led the constitutional opposition to the sovereign. Under the Lancastrian kings the mediæval constitutional monarchy attained its height. Not only weak kings, like Henry IV and Henry VI, were perforce true to their constitutional obligations. We see the same loyalty even in a strong monarch like Henry V, who was vigorous enough to renew Edward III's claim to the French throne and lucky enough to profit by French divisions and make himself ruler of the more important half of the French monarchy. Under Henry V also the other characteristic feature of Lancastrian policy manifested itself most fully. This was the ecclesiastical reaction in favor of the strict orthodoxy with which the house of Lancaster was as much identified as with constitutional principles. If Edward III and Richard II had trifled with Wycliffe and his followers, Henry IV and Henry V were only content with extirpating Lollardy and all its works. Their policy was made easier by the socialistic and revolutionary extremes into which some of the Lollards had drifted. The early 15th century was not ripe for radical revolution in the Church, and the downfall of heresy was the more rapid and complete since Wycliffe's teaching had never really established itself in popular favor. For another hundred years the majestic unity of the mediæval Church was to be maintained. But even leading churchmen were half conscious that the Church's hold over men's minds was no longer what it had been. The life and freshness of mediæval Christianity were gone, even though the Church remained as rich, as proud, and as outwardly glorious as ever. In its weakness the Church clung for support to the State which in the great day of mediæval religion it had aspired to direct and control. A chief feature of 15th century life is the political ecclesiastic serving Church and State with equal fidelity, but discharging his duty to both masters in a thoroughly worldly spirit.

Lancastrian constitutionalism lasted little more than 60 years, though Lancastrian orthodoxy preserved England from religious revolution for nearly a century and a half. It was soon found that constitutional government under mediæval conditions meant weak government. Power went, not to the people at large, but to the great landholders. A turbulent aristocracy took advantage of the rule of a weak king to wage hereditary feuds against its rivals and reduce the land to a condition of chronic anarchy. Things grew worse when a revival of French nationality followed the wonderful deeds of Joan of Arc, and Henry was gradually deprived of the monarchy of France which had been conferred on him in his cradle with the good-will of many millions of Frenchmen. The bloodthirsty heroes of the French war transferred their fierce activity from France to their native land, and the permanent anarchy developed into a generation of intermittent civil war. This is the period of the so-called Wars of the Roses, which, beginning with the first battle of Saint Albans in 1455, went on with occasional breaks until the Battle of Bosworth in 1485. The nominal occasion for these wars was the legitimist claim of the house of York as the true heirs of Edward III, but the real cause of the triumph of York over Lancaster lay not in Edward IV's superior nearness in blood to the common ancestor, so much as in the fact that Edward IV was a strong man who could give the English people the peace and order which were necessary to enable the ordinary citizen to till his farm or transact his daily business. The fall of Henry VI involved the failure of mediæval constitutionalism, and the supersession of a lawless anarchy that adopted the name of liberty by the capable and autocratic rule of a vigorous monarch, who cared little for constitutional forms and everything for making his authority supreme. Family divisions within the Yorkist house and the last expiring efforts of the baronial party retarded the restoration of a strong monarchy after the death of Edward IV and gave the house of Lancaster a chance of reasserting itself. Lancaster was now represented by the Welsh house of Tudor, which on the female side claimed a connection of doubtful legitimacy with the line of John of Gaunt. But Henry Tudor's triumph at Bosworth Field meant not the abandonment but the strengthening of the new system of strong monarchy which Edward IV had first begun. The Tudor despotism continued the Yorkist tradition and made permanent the fall of mediæval constitutionalism. But the middle ages were now wearing themselves out. The Church and the baronage had in turn exhausted themselves, and even the disorder of the Wars of the Roses did not do much to check the growth of the middle classes, and the spread of a higher standard of national prosperity than more heroic earlier conditions had permitted. The Reformation and the Renaissance were at hand, and a new chapter in English history was about to open.

Bibliography.— W. Stubbs' 'Constitutional History of England,' in three volumes, gives not only the most authoritative account of the development of the English mediæval constitution, but the most broad and general commentary on the turning points of mediæval political history. More political details can be found in the three volumes of the 'Political History of England,' edited by W. Hunt and R. L. Poole, which cover this period; Vol. II, 1066–1216, by G. B. Adams; Vol. III, 1216–1377, by T. F. Tout, and Vol. IV, 1377–1485, by C. W. C. Oman. For ecclesiastical history, consult W. R. W. Stephens, 'History of the English Church,' 1066–1272; and W. W. Capes, 'History of the English Church in the 14th and 15th Centuries.' Economic history can best be studied in W. Cunningham's 'Growth of English Industry and Commerce,' Vol. I; and in W. J. Ashley's 'Economic History,' Vol. I, parts 1 and 2. Much information can be gleaned from the unequal but often useful 'Social England,' Vols. I and II, edited by H. D. Traill. Mary Bateson's 'Mediæval England,' 1066–1350 ('Story of the Nations') is very valuable from the same point of view. Among many studies of detached periods, persons and aspects of the subject may be included Mrs. J. R. Green's 'Henry II,' and T. F. Tout's 'Edward I' (both in the 'English Statesman Series'); Stubbs' 'Early Plantagenets,' and Warburton's 'Edward III' (Epochs of Modern History'); C. L. Kingsford's 'Henry V' ('Heroes of the Nations'); W. Hunt's 'English Church in the Middle Ages,' and R. L. Poole's 'Wycliffe and the Movements for Reform' (both in 'Epochs of Church History'); G. W. Prothero's and C. Bémont's 'Simon de Montfort,' the latter in French; F. A. Gasquet's 'Henry III and the Church,' and the same writer's 'English Monastic Life' ('The Antiquary's Books'); Kate Norgate's 'England under the Angevin Kings' and 'Jack Lackland' are important for the 12th and early 13th centuries; H. W. C. Davis' 'England under the Normans and Angevins' is valuable up to 1272; G. M. Trevelyan's 'England in the Age of Wycliffe'; A. Réville's and C. Petit-Dutaillis' 'Le Soulévement des Travailleurs d'Angleterre en 1381'; J. H. Wylie's elaborate 'History of Henry IV' (4 vols); J. Gairdner's 'Introduction to the Paston Letters,' and the same writer's 'Life and Reign of Richard III.' Sir J. H. Ramsay's 'Lancaster and York' (2 vols.) are a great storehouse of facts for the period 1399 to 1485.

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4. THE REFORMATION IN ENGLAND. There are three main factors in the Reformation. It represents, first, the conflict of the growing spirit of nationality, symbolized by the State, with the mediæval idea of the unity of the civilized world, expressed especially in the Catholicism of the visible Church. Secondly, it embodies the revolt of a laity increasing in wealth, education and intelligence, against the control and privileges of a priesthood declining in enthusiasm, conviction and moral fervor; and, as such, it may also be described as the religious aspect of the political advent of the middle classes. Thirdly, it is an assertion of individuality against a collectivist control over thought, opinion and curiosity. These three ingredients are found in varying proportions in different countries. The second element was obvious everywhere, though it was weak in such countries as Spain and Poland, where a commercial class was almost nonexistent. In Germany, where national unity had been shattered in the struggle for empire, and where particularism ran riot in the absence of national control, national feeling, after a momentary explosion in the Hundred *Gravamina* and a transient enthusiasm for Luther at the Diet of Worms, failed to concentrate in practical channels, and individual Protestantism held sway until it too became the state religion of territorial princes. In England all three elements were present, though individuality, or

Protestantism, fought an unequal fight with the New Monarchy and toleration was beaten by an Established Church.

The spirit of nationality, of which the New Monarchy and the Established Church were the outward manifestations, had been stimulated by reaction against foreign influences in the 13th century, misdirected in the 14th toward the conquest of France, and dissipated in the 15th by civil broils. At length it found unity and direction under the Tudors, who frankly and firmly based their power upon new social forces. Feudalism, as represented by the great noble houses, was discredited and trampled under foot; political authority was taken from it and entrusted to lay or ecclesiastical ministers, who, like Wolsey, Cromwell, Cecil, Walsingham, were sprung from the upper or lower middle classes. Order at home and peace abroad were dictated by the interests of these commercial classes. Peace with money was Henry VII's ideal. Even Henry VIII compressed the wars of a reign of 38 years into a few months, and insisted that they should not disturb trade relations with the Netherlands; and Elizabeth's wars were waged for piracy or self-defense. The age of chivalry was gone; wars, if waged at all, were waged with ledgers, not with lances. Men were made esquires and knights in the countinghouse and not on the field of battle.

For these struggles new kinds of brains were wanted, different from those which had designed mediæval castles or coats of arms. The day of the knight had passed away, and to him succeeded the merchant, the manufacturer, the financial expert. These men were as yet unused to political responsibility; they needed training under the Tudors—and they got it. Under that dictatorship Parliament was molded and developed as the instrument of government, and Parliament is the work of the Tudors to an extent which an age nurtured on Parliamentary legends is unwilling to admit. Parliamentary privileges first became real in the 16th century; freedom of speech, freedom from arrest, and control of taxation are conceded, not because monarchy is weak, but because it recognizes that the people are its source of strength. Parliament is the foundation, not the rival, of Tudor power. It is true that in the interests of expediency and efficiency many a time-honored maxim is strained or broken; benevolences are levied, though benevolences had been declared illegal; but that is because benevolences, in the words of a Tudor statesman, «do not grieve the common people.» Morton's Fork and Dudley's Mills were instruments of extortion, but the operation was not painful to the poor. Dukes and cardinals passed suddenly and swiftly from the palace to the prison, but the man in the street did not pass his time in palaces and generally escaped the prison. The success of a dynasty, whose tyranny has been so loudly denounced, is, in the absence of the usual supports of despotism—a standing army or a vast bureaucracy—only to be explained on the supposition that, while the vocal classes were offended, the dumb masses were content.

It was the work of Henry VII to base the Tudor throne upon the interests of the commercial classes. His son appealed to national feeling against a universal Papacy and to lay impatience of ecclesiastical control. But he did not appreciate either grievance until Pope and Church crossed his personal will. The first half of his reign was a brilliant and somewhat tawdry pageant, staged by Wolsey with the effect, if not with the object, of diverting the king's and the nation's mind from more serious matters. In it England played the part of arbiter of Europe with a success due to the wealth left by Henry VII, to Wolsey's diplomatic skill, and to the evenly balanced rivalry between Charles V and Francis I. But the pageant came to an end; wars and subsidies to foreign princes exhausted Henry's wealth (1522); Parliament refused to become the paymaster of Europe (1523); the balance between Charles and Francis was destroyed at Pavia (1525), and Wolsey's influence abroad collapsed. A domestic question intruded into Henry's notice. Catherine of Aragon was now (1527) beyond child-bearing, and her only issue was the Princess Mary. No queen regnant had ever sat on the English throne, and it was popularly thought that they were disqualified. Henry VIII had no brothers, and no nephews except the alien Scottish king, whose title as an alien might be barred at common law. A recrudescence of the struggle for the crown was feared, and various claimants had already been suggested. The prospect was horrible to a generation begotten in the civil wars; and as early as 1514 it was rumored at Rome that Henry would get a divorce because of Catherine's failure to present him with an heir to the throne and of the estrangement between England and Spain. But matters mended in this last respect, and the Princess Mary arrived on the scene; she gave promise of brothers, and Henry was satisfied for the time. But brothers never came, and the idea of a divorce revived. There were precedents enough in Henry's family circle; both husbands of his sister Mary had been released from inconvenient matrimonial ties, and his sister Margaret was no less favored by the Papacy. Henry's need was quite as great as theirs, his merits in his own eyes greater. Anne Boleyn doubtless added zest to the suit, but Henry's anxiety for a wife and not a mistress was due to the state of the succession.

He met with unexpected obstacles. Pavia had made not only Francis but also Clement VII practically the prisoner of Catherine of Aragon's nephew. Charles cared little for his aunt, but it was a matter of vital importance to him that a princess who was half a Spaniard should sit on the English throne and secure England for the Spanish instead of the French alliance. His control over Clement would make a divorce harder for Henry VIII than it had been for Louis XII, Henry IV of Castile, Margaret, Queen of Scotland, or the Duke of Suffolk.

For a time, indeed, success seemed possible and near. France recovered from Pavia and sent an army into Italy. Charles's star seemed on the wane: Clement was freed and Campeggio was sent to England in 1528 with a commission ample for Henry's requirements. But appearances were deceptive; the French hope failed; Campeggio was ordered to do nothing except pass the time till the fortune of war should decide the divorce. In 1529 Italy became imperialist and Clement with it; Campeggio was recalled, and the case revoked to Rome. As Wolsey said, this meant not merely his own fall but the ruin of the Church in England. He alone stood for 15 years between it and its enemies. The Parliament of 1514 had anticipated some of the demands of 1529–36. The unpopularity of the Church alarmed ecclesiastics at that time, and men knew well enough that the Crown had only to abandon the Church for the Church to fall. Doctrine had little to do with this antipathy at first. It was the privileges, the perquisites and the power of the Church which excited discontent; not its ritual or its dogma. The laity were Catholic and they did not object to persecution; but they did object to persecution by priests; they wanted lay control of the penal machine, and they envied the wealth of the Church. In spite of theological appearances it was a commercial and utilitarian age which saw no advantage in vast endowments for contemplative monks or for non-reproductive purposes, and in holy-days on which men were precluded from the pursuit of wealth. There was moreover the sentimental grievance against Papal power which was the tool of a national enemy, and the growing spirit of nationality caused everything foreign, and especially a foreign jurisdiction, to be regarded with suspicion.

The first thing Henry did in 1529 was to turn out his ecclesiastical ministers, and put laymen into their places. This restored harmony between Parliament and the government; and although there were occasions on which Henry VIII came into conflict with the Reformation Parliament and had to give way, both were bent for different reasons on "reforming" the Church in the sense of reducing its power. The foundation of that power was the Papacy, an institution beyond the reach of national control. The Church in England could never be curbed so long as it drew support from an independent authority. Nor indeed could a reformation, in a more legitimate sense, be effected by any other means than the national state. General councils had failed; Popes had ceased to try; the acts of a national Church acting independently of the Papacy would be *ipso facto* void. Not a monastery could be dissolved without the Papal sanction; and Archbishop Warham said that he was merely commissary of the Pope, exercising as *legatus natus* a jurisdiction which he did not possess as primate. The national state was the only authority which could act independently of the Pope. The Reformation was therefore a revolution carried out by Acts of Parliament at the expense of the Church. By the successive acts of Annates, Appeals and Supremacy the financial and jurisdictional rights of the Pope over the Church in England were transferred to the king; the Church was nationalized by the substitution of a national for a cosmopolitan head, and it became the Church *of* and not the Church *in* England.

Such a transformation was incompatible with the continued existence of the monastic orders. They were a negation of the national principle, being essentially international in government and in spirit. They had secured exemption from every sort of national control; and their immediate subjection to the Papacy caused them to be regarded as in a special sense the militia of the Pope. This was the ultimate cause of their dissolution, as opposed to their reform. The necessity for reform was admitted by a Papal commission in 1537, but Henry VIII and Cromwell assumed the case for mending the monasteries to be a case for ending them. They were also useful as a gigantic bribe to induce the upper class laity to concur in Henry's measures and support them after his death; but this use of monastic endowments forbade their devotion to educational purposes, and from this point of view an unequaled opportunity in English history was sacrificed.

So far as doctrine was concerned, Henry VIII made comparatively little change, though the denial of purgatory in 1536 cut deep at the root of the Catholic system and there were indications that the king was preparing for further changes in 1546–47. But the general impression was, as Hooper said, that the king had destroyed the Pope but not Popery; the doctrinal reformation was the work of Edward VI's ministers. Protector Somerset's changes were comparatively moderate and are represented by the first Act of Uniformity and the First Book of Common Prayer (1549). The latter especially was a compromise and its design was to open the door for the new learning without closing it upon the old. The definite breach with Catholicism came when Somerset had fallen as the result of his sympathies with the peasants in their protest against enclosures. Northumberland, who engineered the reaction against the Protector's liberal policy, played for the support of the extreme Protestants on whom alone he could rely in an attempt to exclude the Princess Mary from the throne. In 1552 by the Second Act of Uniformity and Second Book of Common Prayer the door was definitely shut on Catholicism; but so far as inspiration was sought from the Continent and not from Wycliffe, that inspiration was Zwinglian and not Calvinistic. It was not till the Marian exiles returned from Geneva that Calvin began to exert an appreciable influence on the Church in England.

Northumberland's championship was enough to ruin any cause; and the identification of Protestantism with his harsh and violent rule involved it in a discredit from which it was only redeemed by the blood of the Marian martyrs. Queen Mary came to the throne as a representative of the Tudor tradition against a self-seeking revolutionist; even her Spanish marriage was based on the approved policy of alliance with the House of Burgundy, and in religious matters few dreamed at first of anything more than a return to the system of Henry VIII. Wyatt's ill-advised rebellion, the truculent spirit of Mary herself, the character and conduct of many of the Reformers were responsible for the persecution which reached its height in 1555–56. It involved a gross miscalculation. Englishmen of that day were not squeamish, but no generation in England had witnessed anything like the burnings of Queen Mary. They rehabilitated instead of discrediting the Reformation; and the subsequent popularity of Foxe's 'Book of Martyrs,' with all its exaggerations, is proof of the impress of the persecution on the national mind. It was deepened by the association of this violent policy at home with weakness and disaster abroad. Tudor prestige depended largely upon the figure they cut in Europe, and Mary's well authenticated remark about Calais illustrates her appreciation of the failure of her policy. Her fate was hardly less tragic, though more deserved than her mother's.

Elizabeth personified the revolt from Rome, but not a Protestant or a Catholic theology. She was purely a *politique,* and if she ostentatiously kissed the Bible in the street on her way to coronation, she was careful to show the crucifix in her private chapel to her brother-in-law's ambassador; and the ambiguity of the Ornaments Rubric had its value in international politics. That the late persecutions would cease was certain, but all the rest was made as doubtful as might be to the prying eyes of the foreigner. It was, however, largely a diplomatic pose adopted by the queen, partly to parry a real danger and partly because it was of the essence of her nature to shirk responsibility. The wonderful unanimity with which the bishops refused to countenance Elizabeth and her ecclesiastical settlement shows that they were under no misapprehension. That settlement was no mere return to the Anglo-Catholicism of Henry VIII; it did not go so far as the second Prayer Book of Edward, but it went a good deal farther than the first. Nor was repudiation of Catholicism so novel or so dangerous a thing as in Henry's reign. By the Peace of Augsburg (1555) the empire had resigned itself to the public licensing of heresy. Calvinism was planted in the heart of Europe; the revolt of Scotland from the Papacy withdrew a thorn from England's side, and civil war in France placed another Catholic country *hors de combat.* Spain alone could think of a Catholic crusade, and Philip II soon had enough to do with heretics and rebels in his own dominions. Elizabeth had more to fear from plots than from invasion, and her main task was to keep her subjects in a state of tolerable suspense until the financial and military weakness of the realm had been repaired. State and Church had become so closely interwoven that national unity was thought to require some sort of ecclesiastical uniformity. But it was to be one of externals principally; men must go to church on Sundays, but Elizabeth boasted that she made no windows into men's souls. It was, however, impossible to avoid religious persecution when one religion involved a royal, and another a papal supremacy over both Church and State; and religious persecution went on in England until the Church practically abandoned politics and the State theology.

The plots against Elizabeth were, however, almost as much political as religious. The Bull of Deposition (1570) was a convenient screen; but even Philip II did not launch his Armada until Mary Stuart had left him her claims to the English throne and Drake had goaded him into fury by attacks on Spanish trade. The northern earls who rebelled in 1569 were fighting the fight of expiring feudalism as much as of the Counter-Reformation; nor is it easy to believe that the Catholic religion was the sole concern of the queen who married the Protestant Bothwell according to Protestant rites. The political chessboard was divided into national and religious squares, and the moves were often complex; for while the bishops were supposed to keep to their own color, the rival queens and their knights might move on either. From the dynastic point of view Elizabeth was handicapped. Precluded from matrimony by a physical defect, she had to leave the succession to look after itself, and makeshift with suitors. She prolonged this game almost beyond the limits of public decency; but it was done with inimitable skill and gave England an invaluable breathing space of 30 years. At length the success of Parma in consolidating his power in the Southern Netherlands (1580–84) and the stroke of fortune which gave Philip the Crown of Portugal with its colonial empire, its harbors and its navy (1580) induced him to make a bid for the title of which the death of Mary Tudor had deprived him, and the death of Mary Stuart had left him heir. It was a forlorn hope from the first. Philip's failure in the Netherlands might have warned him of the odds against him under circumstances far less favorable. There is no reason to suppose that Philip would have been successful even if the Armada had disgorged its hosts on English shores. Drake and his colleagues saved England not from conquest but from a bloody and perhaps a long drawn struggle fought on English soil.

With the defeat of the Armada the work of the Tudors was done. Their dictatorship was the result of an emergency at first domestic and then foreign. So long as the danger lasted of internal disruption or external attack, Englishmen acquiesced in the despotic maxims of *droit administratif* and Roman civil law. The people supported arbitrary government to avoid a greater ill; but with the danger there passed the need and the inclination to subordinate self-government to national security. Elizabeth lingered a few more years on the stage, but she was losing touch with her people. Her waywardness, as Parliament told James I, was only tolerated because of her age and her sex, and the Commons were girding themselves for their hundred years' war with the crown.

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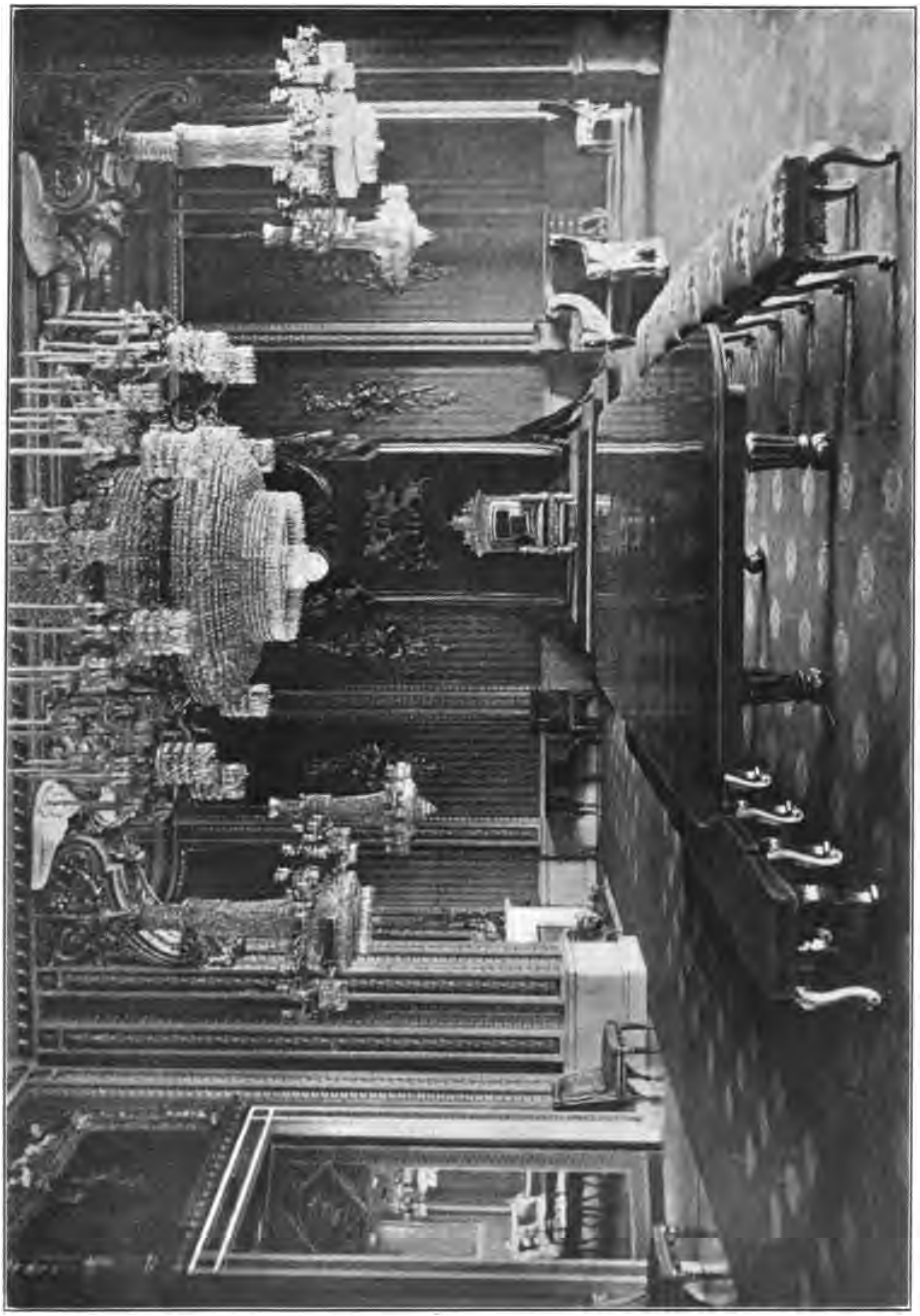

Throne-room, Buckingham Palace, London

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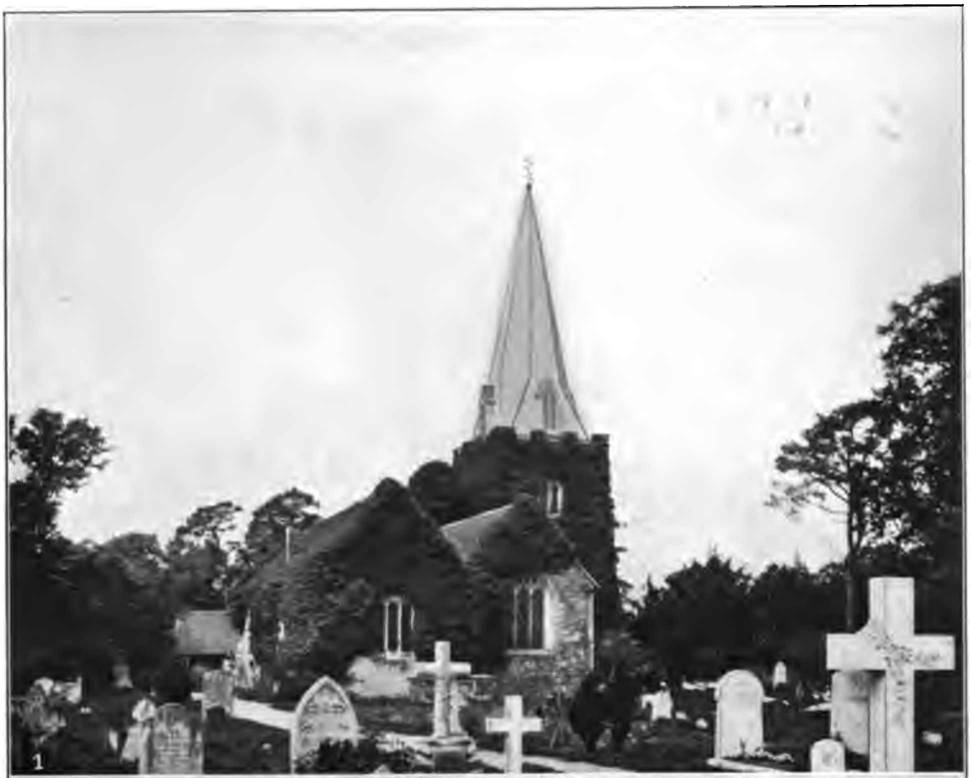

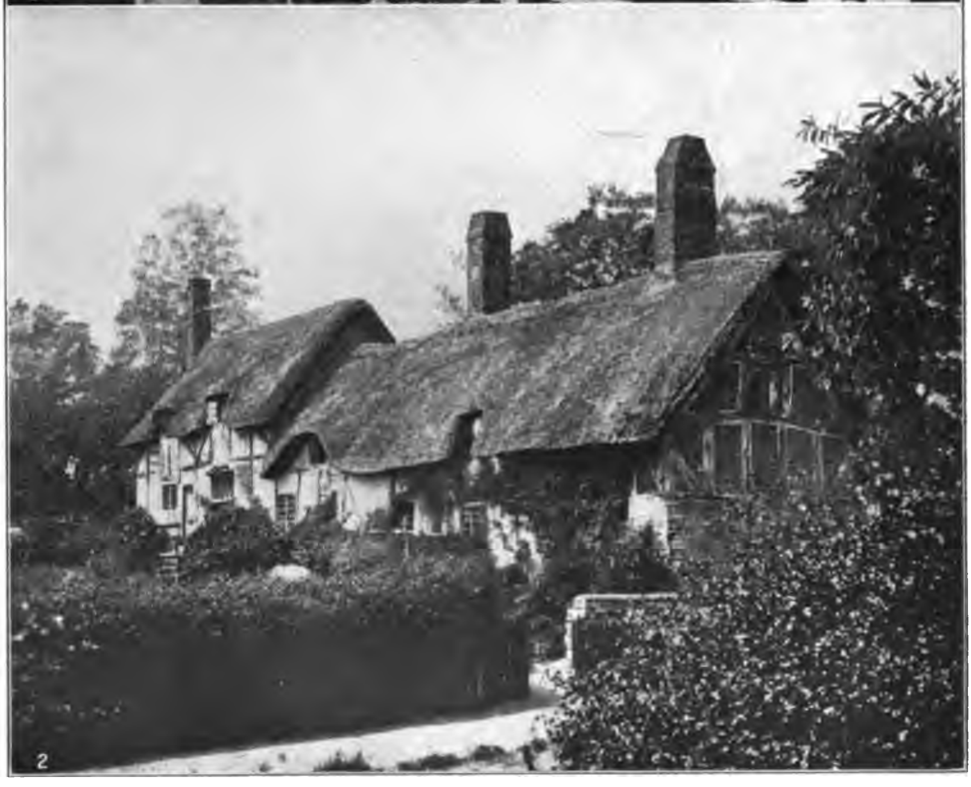

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5. ENGLISH HISTORY OF THE 17TH CENTURY. The intensely dramatic nature of the events of the political life of England in the 17th century has led every English and American historian to attribute to the period an exaggerated importance. The generally accepted view held by these historians is that the Stuarts attempted to perpetuate or to live up to the pure type of Tudor despotism, and that partly because of their want of personal popularity, and partly because of the silent growth of national self-consciousness, the attempt was a failure; and that as a consequence the century witnessed the definitive overthrow of the Tudor system of paternal despotism — an overthrow in which the chief operating factor was the Great Rebellion.

Such a view involves a serious misconception of the real nature of the problem which the century had to solve and at the same time a still more serious misconception of the actual constitutional advance which that century achieved.

The real problem which the century had to solve was not the setting up of one ideal of state or government upon the ruins of another ideal. History does not concern itself with ideals. It concerns itself with men and things — men who are flesh and blood and intensely practical, and things which are more sternly practical still — such things as, when they mount the saddle, ride mankind. The real problem of the century was how to bridge over the gulf between the executive and the legislative.

Under Elizabeth the central power from which the whole executive machinery radiated was the Privy Council. That body was simply a small permanent Council of Government or Council of State. With the sovereign at its head, it was the government. The whole executive administration of the country rested upon it. Without dividing itself up into committees at all, but simply sitting together as a single and permanent body, this Council decided each and every question of administration, whether relating to the land forces, the calling out of the militia, their equipment, and the whole plan of any military operations, or to the naval forces, including the arranging of transport, the making of contracts with the victualler, and the stragetical distribution of men and ships, or again to diplomacy, including every species of confidential letters and instructions to ambassadors and agents abroad, or again to finance, including especially a most strict control of issues out of the exchequer, or finally to every branch of internal administration and law, the main channel of communication in this last instance being the justices of the peace in the counties.

Where does the Parliament, England's glory, come in in such an enumeration? The answer is simple. It finds no place whatever in it. And if Elizabeth, to take her for the moment as the type, had been able to live off her own, as the kings of England were then supposed to do, never a word would have been heard of a Parliament. So long as it could pay its way the executive was efficient and sufficient without the Parliament. During the 44 years that Elizabeth reigned she called 13 Parliaments at irregular periods but with an average interval between each of more than three years. These Parliaments sat as a rule about two months. The total aggregate period of session of the whole 13 Parliaments was less than 34 months. So that out of the whole 44 years of her reign the Privy Council or executive had uncontrolled management of the nation for nearly 42 years. Nor would it be correct to say that during the remaining two and a half years the executive was confronted by the Parliament. That body was called simply for the purpose of supplying the government with money. Having dutifully voted its tenths and fifteenths it was allowed to legislate on non-contentious matters and was then dissolved. In the whole of the statutes of Elizabeth's reign there is not one of any constitutional importance. More than this, not the slightest attempt was ever made by the legislative to extort from the executive an account of the expenditure of the money thus granted by the Parliament. Once the subsidies were voted there was an end of the matter as far as the two Houses were concerned.

After James I came to the throne this docile attitude of the Parliament to the executive gradually changed. The important point about this change of attitude is not the cause which brought it about, but the form it took, the way in which it expressed itself. That expression is focussed for us in the terms of the Great Contract, the failure of which led to the dissolution of James' first Parliament in 1610. In this bargain of the Great Contract James' position was comparatively simple. In the first year of his reign the Parliament had granted him for life the subsidy of tonnage and poundage. That grant practically put him in the same position financially which Elizabeth had been in throughout her reign. His revenue (from Crown lands, royalties, casualties and customs) was his own. He was expected to live on it, and by that phrase was meant that out of his own he should provide for the whole government of the country — regal, legal, civil, military and naval. If debts arose or extraordinary occasions demanded, he would have to ask for extra grants of tenths and fifteenths just as Elizabeth had been obliged to do. These extra grants Parliament never refused to the Virgin Queen nor did James' first Parliament refuse them to him. But James tried for something more than this. He tried to get an increase of "his own," of his life revenue, that standing, permanent ordinary revenue out of which he had to defray the ordinary expenditure of the State. Nor was the Parliament indisposed to meet him. It accepted the general principle of his demand, and agreed tentatively to increase his life revenue by £100,000 a year on certain conditions. These conditions embodied the Parliament's demands on the subject of their grievances, the Impositions, such oppressive royalties as purveyance, and certain ecclesiastical complaints.

Stretch or construe these points as we will we shall not find in them anything in the nature of a challenge from the legislative to the executive. All the points which the Commons demanded were to be conceded by the Crown,as a matter of bargain. They were to be voluntary sacrifices of prerogative on the part of the king in return for so much cash. When carried out, the executive was still as before to occupy the whole governmental field alone. No part whatever of that field was it for a moment in the Parliament's mind to itself occupy or usurp. It never dreamed of demanding some control over the executive, or even the slightest share in it, either by requesting to be consulted in affairs of state, or by claiming the appointment of any of the king's ministers. The executive was the king's, the ministers were the king's, his completely and his alone, and Parliament never once thought of challenging such a flower of the prerogative. Had the Great Contract gone through the only difference would have been that for the future the king's executive would have agreed to avoid certain acts or to cease the exercise of certain rights of prerogative which had been felt as a grievance. For the rest the executive would have been stronger, not weaker, by the compact, for it would have been better able to pay its way, and so to avoid frequent appeals to the Commons.

Equally noticeable with the subject-matter of the Great Contract was its form. The negotiation was carried on as if it were a treaty between two foreign and totally unrelated powers. The want of connection between the two parties to it could not have been more complete if the king had belonged to one country and the Parliament to another. And between these two parties, the executive and the legislative, the Crown and the Parliament, there was not even a regular and recognized channel of communication. Practically the only means of intercourse was a direct message or speech from the king on the one hand or a petition from the Commons on the other. For the rest all was haphazard. Such members of the executive as sat in the House acted individually each as he thought fit, or as he was bidden, in promoting the king's business. On its side the court party or the executive had no more thought of creating and working some piece of machinery by which the king's business could be piloted smoothly through the House than the House had on its side of ever challenging a share in the executive. There was a gulf between the two which neither side dreamed of permanently bridging over. On neither side did the slightest conception exist of a Constitution in which the executive and the legislative should be linked together.

It was the problem of the 17th century first of all to perceive the necessity of such a link, and then to invent the mechanism. If this statement is a correct diagnosis of the true bearing of English 17th century history, then the constitutional importance which has hitherto been attributed to that history will be found to be exaggerated. For the simple fact remains that the clear perception of the need was only attained at the close of that century, and the mechanism itself was only gradually elaborated in the 18th century.

Fortunately or unfortunately the Great Contract broke down, and from that moment commenced that antagonism between Crown and Parliament which was destined to produce the Great Rebellion. The steps by which that antagonism developed itself until it blazed out in open war need not be detailed here. They are the commonplaces of history. The point to notice is that the moment the antagonism emerged the opposition of Parliament to executive, or of nation to Crown became not so much constitutional as political. What is the distinction between these two terms? The difference is fundamental, for whilst the one is a matter of principle and abiding, the other is a thing of time and place, and may be transitory. Had the nation said to James through Parliament as its mouthpiece, "You represent and wish to perpetuate the Tudor type of government by prerogative; we have outgrown that and claim for ourselves a share of the government," such an attitude would have been constitutional. But nothing of the kind was either said or thought of. The opposition which developed itself was conditioned in its form by the mere force of circumstance. When, after 10 years of rule without a Parliament, James in 1621 summoned his third Parliament, there were reasonable prospects of a complete agreement. The House, glowing with Protestant fervor, made not the slightest reference to the old burning question of impositions. It sat down at once to consider supply for the support of a war in defense of the Palatinate. For the first fortnight of the session James could have done anything he pleased with the Commons. Ten months later, in December 1621, after with his own hands tearing out of the journals the Protestation of the Commons, the king dissolved the Parliament in anger and sent three of its members to prison. How could so complete a change have happened? The answer is simple. The Constitution provided no mechanism by which James could explain to the Parliament his foreign policy. He could not, nor would he if he could, take the whole House into his confidence, and he never thought, any more than did the House itself, of such a device as that of taking a select few of the leaders of the Commons into his counsels. Nothing is more remarkable in this Parliament than the scrupulous regard which the House paid to the king's prerogative in the matter of foreign affairs. It was for the king, and the king alone, to make treaties and to decide peace and war, nor could they press him to disclose his policy. Had the Commons felt as certain of the patriotic and Protestant trend of James' foreign policy as the Parliament of Elizabeth's days had been of her foreign policy, not a word of criticism or contention would have been heard. But they were not so certain, and as a consequence felt that they were being called upon to vote supply for a policy which might even be the very opposite of that which the nation yearned for. Then a side issue arose. In his impatience at the slightest doubt being cast upon his foreign policy James was led to assert his view of the prerogative in so dogmatic a way as practically to deny free speech to the House. To this the House of Commons replied by the Protestation, in which they claimed practically nothing but the parliamentary privilege of freedom of speech, just as it had claimed it in Elizabeth's day. This, and this alone, was the cause of the breach.

Will anyone contend that there is anything of constitutional principle in this? If the Parliament had said "We demand to know what your foreign policy is, and that it is in accordance with our views before we vote supply," there would have been constitutional principle involved. But over and over again the Commons disclaimed any such idea. If James was antiquated in his devotion to the Tudor ideal of prerogative the Parliament was just as antiquated as he in their devotion to it, for they distinctly admitted his view, and when they joined issue with him it was on the minor point and on the lower plane of parliamentary privilege.

A remarkable change, however, though transitory as it proved, came over the scene as James' reign came to a close. For some unexplained reason his powers decayed whilst he was still young, though he died at the age of 59. Whether it was due to this premature decay, or to his own intense chagrin at the failure of his long negotiation with Spain, we cannot say. But certain it is that for the last two years of his reign he was a mere tool in the hands of Buckingham. Had it not been for this senility it is certain that the astounding constitutional departure which marked the career of his last Parliament would never have been enacted. James met that Parliament with the practical confession that his foreign policy had been a failure, and he invited their co-operation in the evolving of a policy to take its place. He informed the Houses that his secretaries would tell them the whole story of the marriage treaty with Spain. After they had heard the story, he continued "I shall entreat your good and sound advice . . . . I assure you you may freely advise me, seeing of my princely fidelity you are invited thereto."

The marvelous thing about this sudden and revolutionary surrender of prerogative by James is that it sprang from the dictates of Buckingham. But more extraordinary still was the sequel. Following the dictates of the imperious favorite as tamely as a sheep, James, after receiving the advice of both Houses, informed them that if they made him a grant for a war they might appoint their own treasurers to see to the spending of the money, and further "I promise you on the word of a king that although war and peace be the peculiar prerogative of kings, yet as I have advised with you in the treaties on which war may ensue, so I will not treat nor accept of a peace without first acquainting you with it and having your advice." (8 March 1624).

Accordingly when 12 days later the Commons voted three subsidies and three-fifteenths, the money was ordered to be paid to treasurers appointed by Parliament and not into the Exchequer; and at the same time the Houses in an address to the king plainly laid down the object for which the money was voted.

In the whole course of 17th century history, including the civil war and regicide, there is no more revolutionary incident than this complete, sudden, uninvited surrender of prerogative on the part of James. Had it happened as the result of deliberate thought, and whilst James was still in his prime, it would have shortened by more than a century the birth throes of modern constitutionalism, and have saved the Stuarts from exile.

But it did not so happen. It was a momentary inspiration of Buckingham's, the genesis of which is to be explained by the favorite's own personal position and policy at the time, and it was by him forced upon the feeble king with an impetuosity that swept everything before it. But as with all Buckingham's inspirations, it was no more than a flash and almost as soon over. After the old king's death the versatile but unstable minister made one or two disingenuous efforts to revert to such relations with the Commons. Through the mouth of his creature, Sir John Coke, he submitted to Parliament in July 1625 a rough statement of the expenditure of the subsidies granted in 1624 and again in the following month of August 1625, when the Parliament was sitting at Oxford because of the plague, the lord treasurer made a similar statement. But further than this the concession was not carried. From the position which James had adopted in 1624 Charles gradually receded, not so much from deliberate design as from the mere force of circumstance and from a growing perception of the revolutionary consequences which that position entailed. The desire on the part of the Commons to inquire into the expenditure of the subsidies led them to utter their opinions on the merits of Charles' foreign policy, and in particular to call into question the advice given to the king by the Council of War as to that expenditure. The moment this was clear to Charles any further surrender of prerogatives was impossible. Backed by the king the members of the Council of War refused to reply to the interrogatories of the Commons. Their resistance proved successful. Before the determined attitude which Charles thus took up the House quickly receded and dropped any further attempt at pressing the interrogatories. (March 1626).

With this incident practically ended the whole two years' episode of attempting to take the Parliament into partnership with the executive by means of a voluntary and undefined surrender of prerogative. Had the king allowed the members of the Council of War to answer the interrogatories of the House the principle of ministerial responsibility (that is, the responsibility of the executive to the Parliament, and not to the king alone) would have stood forth in abrupt nakedness. When Charles resisted that demand the emergence of such a principle was postponed for a century. For be it borne in mind, the impeachment of Buckingham, and the later proceedings against Strafford, Clarendon and Danby never advanced the enunciation of that principle a jot. The mere punishment of a minister great or small does not imply ministerial responsibility in our sense of the phrase. All through the 17th century the ministers were the king's servants and were responsible to him, their master, alone. After the exile of Clarendon the Commons did not demand to be consulted as to the choice of his successor, or as to the policy of his successor.

Charles had simply sacrificed one of his servants. That was all. Then he engaged another servant to do exactly the same things and went on as gay and as unconcerned as before.

But had the episode of 1624–26 ended differently the acceptance of the principle of the responsibility of ministers to Parliament as well as to Crown would have led inevitably to the forging of some such link between the executive and the legislative as only came generations later. From the moment such a link had been forged questions of adequate supply for the services and of a proper audit, and again questions of the personal liberty of the subject, of habeas corpus, and what not, would have solved themselves harmoniously. For the participation of the Parliament in the executive would have insensibly tinged the spirit of the whole administration of the country. As compared with the evolution of such a principle the petition of right, habeas corpus, nay, even the revolution itself, are minor incidents.

The remainder of the reign of Charles I, when he ruled without a Parliament, the outbreak of the Civil War, and the consequent military despotism of Cromwell are devoid of constitutional significance. The rule of Oliver Cromwell was a despotism as pure as that of the Tudors, the only difference being that the prerogative of the Crown, which had formed the ultimate sanction of the executive government of James I and Charles I was replaced by the naked power of the sword. The quarrels between Oliver and his Parliaments were in substance and essence the same which had been fought between Charles and his Parliaments. They one and all turned upon the question as to whether and how far the Parliament, the legislative; should thrust itself into the domain of the executive, notably, of course, but not solely, in the matter of the command of the forces. To any such demand Oliver's reply was a much more peremptory, indignant, instanteous *non possumus* than ever James or Charles could have uttered. And when the sword fell from his dying grasp and the succeeding anarchy swept away the chances alike of his dynasty and of pure republicanism, the Great Rebellion had become a mere tale that is told. When Charles II returned at the Restoration in 1660 the Stuart dynasty reassumed the inheritance of an undiminished prerogative, one that is in no whit distinguishable from the prerogative wielded by Elizabeth, James I, or Charles I. He was granted a revenue for life which might, had it been fully realized and carefully husbanded, have made him independent of the Parliament. He was left in uncontrolled possession of the executive. His ministers were his own, nominated by him and responsible alone to him. His revenue was his own, to spend as he pleased, without the slightest restriction in the way of appropriation. His foreign policy was his own, he could make war or peace or treaty unquestioned, and as he chose. Had it not been for the outbreak of the Dutch War it is probable that his reign would have witnessed no parliamentary incursion upon his prerogative. As it was, when under the strain of the shame caused by the first Dutch War the Parliament did actually make an incursion into the domain of the executive, the novel departure took exactly the same form which it had taken in 1624 under James I. No more speaking comment than this could be passed upon the fruitlessness and futility of the intervening period of civil war, regicide and revolution.

The full story of the episode in question is too long to be given here. It has been treated fully in the introduction of the second volume of the 'Calendar of Treasury Books.' In brief, what happened was this: With the full consent of the executive (Charles himself) the Parliament in voting supply for the Dutch War appropriated that supply specifically to that war. The necessary corollary was that a few months afterward the Commons were driven to demand an account of the expenditure of that supply. Had the war been successful there would have been no boggling over such an account. But the war had not been successful. It had brought with it disaster and humiliation, and men's minds were correspondingly inflamed. But even so, the action of the Commons was astonishingly mild. Although the inquiry might have led the Commons to cover the whole field of administration and to question the whole conduct of the executive during the war, the Parliament practically in the end restricted its attention to the question of the auditing of the accounts. Charles at first resisted the proposal as a breach on his prerogatives; but in the finish, with his usual subtle adroitness, he gave way.

The immediate outcome of the inquiry was in great measure the exoneration of the executive from the suspicion of financial dishonesty. But the immediate result is insignificant by the side of the ultimate results. On the one hand it furnished a now unchallengeable precedent for appropriation of supply and for audit of accounts; and once the right of auditing accounts should be fully conceded, the further right of questioning the conduct and policy of the executive was bound to follow. Once that consequence was fully established the gulf which sundered the (king's) executive from the (people's) Parliament was narrowing and a bridge was being built over it. The Parliament was coming to identify its interests with those of the executive instead of maintaining an attitude of permanent aloofness or even hostility. Of the two parties to this conversion the Parliament itself was slower of comprehension and more unwilling of movement than the Crown. For to identity itself with the administration was to forfeit all the vantage ground of complaint and agitation on which it had stood in the past. Accordingly the change did not actually accomplish itself in Charles II's time. For the rest of his reign the parliamentary opposition was swayed by motives which were merely and purely factious. But as the century drew to a close the gulf was in great measure bridged over, and in the course of the 18th century the new structure was perfected. The executive ceased to be the personal property, appanage, officialdom of the king. It became identified with the parliamentary system through the device of parliamentary departmental heads; and the practice of annual estimates took the responsibility for the financial administration of the country from the shoulders of the king, and laid it upon the broader shoulders of the Parliament. From that moment the development of English constitutional and political life has been smooth and harmonious.

But these ultimate results lay unfolded in the bosom of the future. To Charles II the Commission of Accounts taught another and quite different lesson. It taught him the art of parliamentary management, not merely how to buy off the opposition, but also how to organize his own friends in the House. Danby's corrupt leadership of the Parliament, and the various devices employed to influence the constituencies on the one hand, and Sir William Temple's scheme of a reorganization of the Privy Council on the other, are but manifestations of this side of Charles' statecraft. Thanks to this statecraft of parliamentary management, Charles remained easily master of the situation for the rest of his reign, and when he died he left to his brother a prerogative as unimpaired as that which James I had wielded — complete control of the executive at home, complete control of the forces, complete control of the foreign policy of the nation.

From the point of view which has been thus expounded, what was the historical significance of the Revolution of 1688? In a sentence it lies not so much in the direct challenging of prerogative as in the quiet, undefined, unobserved usurpation of it by the Parliament. In the first place the Parliament voted a standing revenue of £1,200,000 for the support of the Crown in the time of peace. This was exactly the sum which the Restoration Parliament had granted Charles II in 1660. But whereas in 1660 that sum was meant to cover the complete national expenditure, civil and military alike, the details and management of which were left absolutely unchallenged in Charles' hands, the vote in 1689 was intended only for the civil establishment in time of peace. Immediately after this vote the Parliament proceeded to consider the question of separate supply for the army, navy and ordance, and in order thereto detailed estimates of the charge of the army and navy were laid before the House.

Herein lies the Great Revolution — not in the clauses of the Bill of Rights. For the moment the Parliament realized that the provision for and regulation of the army and navy was its province it had assumed to itself half the domain of that kingly prerogative which had endured through Tudor and Stuart times. It had stepped over the gulf which had hitherto divided the domain of the executive from that of the legislative. Once this first step had been taken, there remained only the problem of evolving the machinery by which the participation of the Parliament in the executive should be expressed and regulated. The course of the evolution of that machinery — the selection by the Crown of its advisers and administrative departmental heads from the chiefs of the parties in the Parliament — was determined by the mere force of circumstance, that is, by the situation in which William III, and again, a generation later, George I, each found himself as the imported ruler of a strange country. The gradual development of the party system of government afforded the key to the solution of the problem of which the 17th century had been so long in labor. For when once the obvious step had been taken of selecting the party chiefs as the heads of the various executive departments, the development of the system of Cabinet government was bound to follow sooner or later. But even so, generations had still to elapse before this new parliamentary executive fully grasped the control of that last and most highly prized flower of the kingly prerogative, the direction of the foreign policy of the country.

So far as these results depended upon the mere accidents of the Revolution of 1688 and of the Hanoverian Succession they may be regarded as, in a sense, fortuitous. If it is true that England has blundered into an empire, much more true is it that she has blundered into a Constitution.

If the ordinarily accepted view of the constitutional importance of our 17th century history is wide of the mark and distorted, much more truly may this be said of the ordinary view as to the religious history of that period.

The chief outstanding features of that religious history are, firstly, the absolutely unreasoning fear of a Catholic reaction, and, secondly, the temporary exaltation of Puritanism.

These two are by no means synonymous. For whereas the jealous fear of Catholicism was national, pervading the country blindly from end to end, the triumphant emergence of Puritanism was local, partial, temporary. But if the two are not synonymous they have been alike in their fate. With the inscrutable irony of her passionless lips the Muse of History has consigned them both to the region of human futilities. The further we are drifted from the 17th century by the stream of time the more difficult does it become to us to realize the standpoint of that century on the question of the Catholic reaction. We can see now that whatever form that attempted reaction took, whether it be of the theological discussions which waged in the presence of James I as the divines flocked round his chair, or of Laud's unattainable conception of an unifying Catholicity, or again of Charles II's cynical but more statesmanlike conception of Indulgence, or finally of James II's grossly bigoted intrigue, in one and all of these or any other forms the movement was doomed to failure before its birth. The panic, the absolutely unreasoning fear, the blinded and relentless fury which seized the nation again and again throughout the period and which not only accounted largely for the rebellion of 1642 and the revolution of 1688, but also left their malignant trail on two centuries of our later history, fill us to-day with only a sense of disdainful surprise.

As for Puritanism, the second religious phenomenon of the century, the judgment of our own day has been more sympathetic, partly because it has been the fashion since Carlyle's day to speak of it in terms of respect, and partly because the movement has not yet lost its force in English and American life. But be it borne in mind, in the 17th century Puritanism in its day of power did not show itself a constructive force either in the domain of dogma or in the domain of ecclesiasticism. The dogmatic wrangles of the Westminster Assembly — the discussions as to the method of the imputation of Christ's righteousness and what not else — are utterly meaningless to us. And when Puritanism was called upon to solve the problem of the erection of a national church it completely failed. In the mere interests of human tolerance Cromwell, himself a Puritan of the Puritans, was forced to take the problem out of the hands of his co-religionists and thereby to dash to the ground their half-finished and futile structure. And will anyone contend that either in its persecuted birth or in its day of exaltation, when for a brief span it wielded the wooden sword, or again in its day of adversity when at the Restoration 2,000 of its ministers left the national church to wander in the byways of Separatist Dissent, that in any one of these its forms Puritanism was ever a missionary movement or a missionary church in the sense in which 18th century Methodism was a missionary movement? Such contention could not be maintained. The basis of Puritanism was dogmatic and clerical throughout; the fervor of humanity never breathed into it a spark of missionary fire. Its zeal was spent in the dogmatic defense of forms of church government, in the safeguarding of the church membership of each little community. To the nobler issues of life, to the higher conception of toleration, of humanity, or national religion it was, and throughout the succeeding century it remained, cold and dead.

Bibliography.— The original authorities for 17th century English history consist of:

1. Parliamentary records: the 'Lords Journal' and 'Commons Journals' which are in print; and much material still in manuscript at the House of Lords, but which is being gradually printed by the Historical Manuscripts Commission. The only full edition of the Acts of Parliament is the 'Statutes of the Realm,' but this collection does not contain the Commonwealth Acts and Ordinances. These latter can only be obtained from the collections of Husband and Scobell, and from the separately printed ordinances.
2. The archives in the Public Record Office: comprising mainly (a) Domestic State Papers calendared up to 1675 and from 1689–93. (b) Foreign State Papers, not calendared at all for the 17th century. (c) Colonial papers, only partially calendared. (d) Certain departmental archives, and Commonwealth Committee archives, only partially calendared as yet. Of the departmental archives the Treasury Records are the only ones at present being calendared; similarly the printing of the 'Register of the Privy Council' has not yet reached the 17th century.
3. Archives not preserved at the Public Record Office, viz.; (a) Collections of manuscripts and individual manuscripts at the British Museum, at the Bodleian (including the Clarendon manuscripts, Carte manuscripts, and Tanner manuscripts), and at Lambeth (including the Commonwealth Church Manuscripts). So far as these sources have been worked at all it has only been by individual effort or by societies such as the Camden. Of the manuscripts printed by the Camden Society, the 'Clarke Papers,' 'Nicholas Papers,' and 'Lauderdale Papers' may be particularly instanced. (b) The archives in the possession of private families are being systematically printed by the Historical Manuscripts Commission. So many of the reports bear on the 17th century that it is almost impossible to particularize, but the 'Buccleuch manuscripts,' 'Portland manuscripts,' 'Ormonde manuscripts,' 'Cowper manuscripts,' 'Rutland manuscripts,' 'Fleming manuscripts,' 'Stuart manuscripts' and 'Kenyon manuscripts' may be specially instanced.
4. Printed collections of state papers, viz.: Winwood, Sydney, Roe, Wentworth, Rushworth, Nalson, Thurloe, Milton, Clarendon, Orrery, Macpherson, Hardwicke, Rochester, Carstairs, Kemble and Stuart Papers.
5. Diaries, memoirs, etc., other than those published by the Camden Society and other societies, viz.: Whitlock, Burton, Ludlow, Holles, Fairfax, Hutchinson, Price, Herbert, Reresby, Warwick, Berkley, Evelyn, Pepys, Anchitell, Grey, Luttrell, Ellis Letters.
6. Constructive synoptic works: Rapin and Tindal, Baker, Clarendon's 'History' and 'Life,' Carte's 'Ormond,' Kennett's 'Register' and 'History,' Burnet's 'Own Time,' Andrew Marvell's works, Sir William Temple's works, Boyer, Ralph and Dalrymple.
7. Of tract literature the mass is so great that the portions which have been printed in the 'Cabala,' 'Harleian Miscellany,' 'Somers' Tracts,' 'State Tracts of Charles II,' and 'State Tracts of William III,' are an inconsiderable fragment of the whole.
8. Of modern constructive historical work the only English one worthy of the name is S. R. Gardiner's great work covering the years 1603–54. Carlyle's 'Cromwell' is a constructive work of distorted view; Macaulay's history for the latter part of the century represents a type of historical writing which is deservedly falling into disrepute among professional historians. Ranke's 'History of England,' and Doctor Ono Klopp's work on the fall of the House of Stuart are scientific and exhaustive. For Church History, Shaw's 'History of the Commonwealth Church' is a specialized work covering only the years 1640–60. The various denominations of the Dissenting Churches, as also the Quakers have an abundant historical literature of their own, but, generally speaking, neither the religious history of the century as a whole, nor the intensely important and interesting economic history of the century have as yet received adequate specialized attention, though Doctor Cunningham has covered many aspects and much of the ground of the latter section in his 'Growth of English Industry and Commerce.'

William A. Shaw,
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6. HISTORY OF THE 18TH CENTURY. Historical Sketch.— The 17th century had settled two very important questions. It had been finally decided in 1689 that the government was to be carried on in accordance with the will of the House of Commons and that there should be freedom for both religious and political opinion outside Parliament. The questions of taxation without consent of Parliament and of the state control of religion, which had convulsed the 17th century, were no longer all-absorbing, and the 18th century found an outlet for its energies in new directions. It is therefore the century of great economic advance, of commercial wars, of the expansion of trade, of the growth of colonies, culminating toward the end in the transformation of the whole rural and industrial life of the country.

The leading features of the period from 1702 to 1815 are those connected with the rule of the great Whig aristocracy in Parliament, the expansion of England abroad in spite of the opposition of France, the consolidation of the

Britannic state at home and the change of the whole character of the country by the coming of machinery. See INDUSTRIAL REVOLUTION (article 32).

The great constitutional fact of the 18th century is that the era of the responsibility of the monarch for the welfare of the nation had passed away for ever. William III had been called to the throne by Parliament and it was on Parliament that he depended for his support. In 1702 the Crown was vested by an Act of Parliament in the Electress Sophia of Hanover and her Protestant descendants, and the first two Georges happened to be men who were thoroughly German and so left English affairs to the English Parliament. Hence the predominance of the House of Commons became firmly established. It was found convenient that a group of ministers should form a committee to carry on the affairs of the nation. Gradually it became the rule for them to be chosen from the party which had the majority in the House of Commons and to vote under the leadership of one man. The delegation of monarchy to the Prime Minister and the Cabinet was accomplished by the end of the 18th century. See CROWN AND CABINET (article 13).

The Revolution of 1689 had split the country into two great parties — the Whigs and the Tories. The Whigs, who were the active commercial party, were in favor of a Protestant succession and toleration in matters of religion. As they believed in a parliamentary king as opposed to a king by Divine Right they were bound to reduce the power of the monarchy but to support the existing line which they themselves had chosen. The Tories had to choose in 1689 between their religion and their king. If they supported the king they would destroy the Established Church and set up the Roman Catholic Church. Hence they decided against the king and joined the Whigs to get rid of the Stuarts. Then they repented, especially when they found that the Whigs obtained all the emoluments of office and to restore themselves to power they looked to France and the descendants of James II who had French support. Meanwhile they were quite willing to join the Whigs in depriving the Hanoverians of as much power as possible and so we see both parties disposed to lessen the power of the Crown. It was not until the reign of George III that the Tories became reconciled to and supported the king *de facto*. The Whigs were the great war party because they were anti-French; the Tories were the peace party since in France lay their hopes of getting back their own king.

In the reigns of William III and Anne the monarch was still able to hold the balance between the two parties. Under the first two Georges the Crown could only exercise its power by means of great ministers, notably Sir Robert Walpole. George III determined to throw off the yoke of Parliament and was successful in bringing in the Tories under Lord North in 1770, but even so popular and determined a king as George III found it impossible to carry on the government except through Pitt. The power of the Crown was still further weakened during the period of mental incapacity of the monarch and by the incompetence of his immediate successors.

During the 18th century it was gradually found advisable in the interests of the despatch of business that the king should choose his ministers from that party which had a majority in the House of Commons. In 1696 a party ministry had been formed, but the lesson was only slowly learned that the Ministry must depend on the state of parties in the Lower House. In the time of William and Anne composite ministries were the rule. Under George I and George II there was a constant Whig majority in the Commons and a Whig Ministry in power. In 1784, however, George III was successful in keeping Pitt in power notwithstanding an adverse majority in the Lower House. But the king only anticipated the decision of the country, for at the next election a House was returned which supported Pitt, and from that time the Prime Minister and the Cabinet have always been chosen from the predominant party.

Thus monarchy, as it «withered on the throne took root in the cabinet.» The parliamentary government of the 18th century was however by no means government by the people. It was government by the great aristocratic families, tempered by deference to public opinion. It was not till the electoral reforms of the 19th century that the democracy became predominant. The great era of English expansion and the command of sea power were attained under an aristocracy and not under a democracy.

The question of English colonial expansion during this period centres round the long struggle with the French. The most profitable line of trade in the world was considered to be that of the Spanish colonies and the adjacent islands, and with these England drove a considerable contraband traffic. On the other side of the world there were the riches of the East and the wealth of the Spice Islands. It seemed probable in 1701 that France, the great commercial rival of England, would inherit the throne of Spain, drive out the English from the Spanish Main and dominate that trade. Hence England's intervention in the War of the Spanish Succession. By a series of brilliant battles won by the Duke of Marlborough between 1704 and 1709 she attained her object, for by the Treaty of Utrecht (1713) England gained Gibraltar, Port Mahon, Nova Scotia, and Newfoundland; while the rights of the Hudson's Bay Company in their vast territory were definitely recognized. England had secured a base from which to operate against the French, and at the same time by the Assiento Contract (see GREAT BRITAIN — EIGHTEENTH CENTURY COMMERCE) she won a share in the monopoly of Spain in America and prevented it being closed to her by France. The war left Holland and France financially exhausted. The Dutch trade began to fall behind. France was heaping up financial burdens which were to lead to national bankruptcy. England alone was in a position adequately to maintain a navy and the command of the sea. She thus became the foremost sea power and secured her trade supremacy in one of the most important quarters of the globe. An attempt to interfere with it led to the war with Spain in 1739, which merged into the war of the Austrian Succession ending in 1748.

In another direction, however, that trade supremacy was being threatened. In India a French and an English East India Company each had trading factories or settlements, the English posts being Bombay, Madras and Calcutta. They were not subject to the English government, but were under the company, and England had no governmental responsibility whatever in the matter.

In India there prevailed, about the middle of the 18th century, a wild anarchy due to the break-up of the Mogul Empire in 1707, and military adventurers were beginning to make themselves supreme in various parts. The French governor of Pondicherry, Dupleix, a man of great military genius, began to perceive that it was quite possible for Europeans to gain predominance in the general scramble; and by supporting various native rulers and organizing native troops on the European model he soon made himself one of the chief powers in India. If the English were not to be ousted altogether they too had to organize. Clive copied the French policy so successfully that English influence became predominant, and the future of India fell into the hands of the English. The French settlements were restored, but they were no longer military establishments, and France was reduced to relative unimportance. In 1784 the English government became responsible for the administration of India, while the East India company continued to have a monopoly of the trade.

The dominance of England on the Spanish Main and in India was followed by the ousting of the French in North America. The French had established themselves at the mouth of the Mississippi, and claimed all the country lying between the Saint Lawrence and the Mississippi west of the Allegheny mountains. The Seven Years' War in Euorpe gave England a chance to fight the matter out, and at the Peace of Paris in 1763 England gained Canada, all the land west of the Mississippi, four West Indian islands, and a promise not to fortify the French settlements in India; and from Spain she obtained Florida.

Thus by 1763 England was mistress of the whole American continent, and the dominant European power in India, while the trade and commerce of the East and West were in her supreme control.

England then felt that as she had done so much to protect the young colonies from being swallowed up by the French they ought to pay part of the cost of their own defence in future. She accordingly proceeded to increase the tax on colonial imports, and to prevent evasion instituted a stricter enforcement of the Navigation Acts. She also imposed a stamp tax. The colonists, who were no longer afraid of the French, wished to be free to work out their own destiny in their own way. Hence the revolt of the Americans in 1776, ending in the recognition of their independence in 1783. France and Spain had joined in against England, and, although the result was the loss of the American colonies, England was given a welcome opportunity of sweeping French commerce off the seas, and of finally destroying the Dutch shipping. England emerged in 1783 more decidedly than ever the great trading power of the world.

The loss of the 13 American colonies raised the question of the disposal of convicts, since they could no longer be sent to the United States. Hence the Government turned its attention to Australia which had been explored by Captain Cook between 1768 and 1770. The island had been the resort of a few traders, but much preliminary work needed doing before it could become attractive to settlers, and the result was that convicts were despatched in 1788 to Botany Bay to do the preliminary work of road-making. Then, as the wool famine in England became more and more acute, the destiny of the colony shaped itself along the line of sheep-farming.

After the Revolutionary and Napoleonic wars England made a further addition to her possessions, gaining the Cape, from which she has been able to build up a South African empire. Ceylon, British Guiana, Trinidad, Heligoland and Mauritius, were minor acquisitions made in 1815; and the foundations of her Far Eastern Empire were laid in the cession of Penang in 1786, which gave England a footing in the Straits Settlements.

The United Kingdom emerged from the Napoleonic wars with a huge national debt, but with an enormously increased trade; with 50 years start of Europe in manufacturing, and with the unrivalled possession of the sea-power which had been her definite goal from the time of Elizabeth onwards.

This great expansion could not have been accomplished if England had not been blessed with internal peace. Had Scotland declined in 1702 to accept a German line of kings and decided to pursue, as a large faction wished, her own independent way with her own king, England would have been in constant danger of invasion from the north on behalf of the Stuarts, or of intervention from an unfriendly kingdom. The Scots having been shut out of the best trading parts of the world, tried to establish themselves on the Isthmus of Darien, but met with disastrous failure, a failure which they laid at the door of England. In England this undertaking aroused a great fear of ultimate Scottish success in this particular line of commerce. It seemed better to absorb the Scots than have them as rivals. England was also anxious to secure the assent of the Scottish to the House of Brunswick as the ruler of the two kingdoms and she accordingly offered them a share in the whole of the English trade if they would acquiesce to a union. The Scottish who were most anxious to get a part of the English trade monopoly, assented. The union of the two kingdoms was thus accomplished, the Scottish sending members to the English Parliament and giving up their own, but preserving freedom in matters of religion. Scotland thus merged her individuality in that of England and accepted English trade privileges as a setoff against a German king.

Ireland was less fortunate. There was not the same necessity for conciliating her. The Irish Parliament was dependent on England, and when the Irish tried to set up their own king — James II — they suffered crushing defeat at the battle of the Boyne. The English were not afraid of Ireland as they were afraid of Scotland. Ireland was a conquered country and as such must take the conditions imposed.

She was, moreover, Roman Catholic, and England could not absorb her in the same way as she had Scotland. Hence Ireland was deliberately prevented from becoming prosperous by a series of laws which shut her out of the colonial trade and destroyed her woollen manufactures and cattle trade. At the same time a series of penal laws against the Roman Catholics were instituted which gave the power into the hands of the Protestant minority.

Both trade disabilities and religious oppression were successful in preventing Ireland from being a danger to England till the revolt of the American colonies gave Ireland the opportunity of claiming an independent Parliament, which demand was conceded in 1782. It became a question then of settling the trade relations between the two kingdoms and of the Irish contribution toward Imperial defence. No satisfactory solution had been reached when civil war broke out between the Irish Protestants and Roman Catholics. England felt that the Protestant interests in Ireland needed protection. Moreover the Irish finances became very involved, and it seemed as if Ireland was on the verge of national bankruptcy. The English manufacturers wished to secure the Irish market whereas the Irish Parliament showed a disposition to impose protective duties even as against England. It seemed best to the statesmen of the time to solve all these various problems by a complete union of the two countries. Scotland had come into the English system when the era of Whig protection was beginning, and she prospered exceedingly. It was hoped that Ireland would do the same. But Ireland came in just when England was engaged in a life and death struggle with France. She felt all the effects of the dislocation of trade and of the great financial strain. Later on her nascent industries were exposed to the overwhelming competition of the English machine-made products, and her provision and corn trade were vitally and injuriously affected by the English free-trade reforms, while she had no compensation as England had in her manufacturing prosperity.

Vast indeed are the changes recorded in the history of the 18th century. At the beginning of that century Scotland, jealous, sullen and separate, was a constant menace to the expansion of England; at the end she had become united with her southern neighbor in a political union cemented by identical trade interests. Ireland also had been united in a common Parliament, but cannot be said to have been absorbed in the same way. William III, like his predecessor on the English throne, acted as his own prime minister. Long before the death of George III the monarch had given place to one of his powerful ministers as the real head of the executive government. In the early years of the century party ties sat lightly upon ministers; at the end of it a cabinet which was not homogeneous would have been an anomaly. At the beginning of the century France seemed destined to inherit the riches of the Spanish Main and the East Indies. The end of the century saw French commerce swept from the seas in East and West and India under British rule. England's colonial empire of the first part of the 18th century was English speaking and not extensive. By the end of the century her principal English speaking possessions had cut themselves adrift; but had been replaced by a scattered empire of many races; and the foundations had been laid of that wide empire, the superstructure of which is not even yet complete.

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7. THE FRENCH WARS OF THE 18TH CENTURY. Hostility to France is one of the chief characteristics of British policy in the 18th century. It may be ascribed to various motives, religious, dynastic, commercial, and to the purely political motive of maintaining the balance of power. At the beginning of the century the first and last of these motives were uppermost. The first collision between the two powers arose out of the efforts of Louis XIV of France to gain complete control of the Spanish dominions, then comprising Southern Italy, Milan and the greater part of the Flemish Netherlands, as well as a large portion of the New World. It is worth noting that the French threat to the Netherlands touched British policy in a vital spot. From the time of Richard I and Edward III, down to those of William III, Wellington and even to the war of 1914, British rulers have very rarely hesitated to defend the Netherlands against a great power which sought to annex them and make them a base of action against the British Isles. Louis XIV, however, would hear of no compromise such as was suggested by William III of England, the Dutch Republic, and the House of Hapsburg, but, in the lack of a direct descendant of the Spanish Bourbons, claimed the crown of Spain for his grandson (subsequently Philip V of Spain), a great-grandson of Philip IV of Spain. He did more. He captured the Dutch troops who shared in the defence of the "barrier fortresses" of the Netherlands; and in 1701, on the death of James II, formerly king of England, but now an exile in France, he promptly recognized his son as king of England. The affront rekindled in England the dormant zeal for the Protestant succession; the House of Commons had to cease from its factious opposition to «Dutch William»; and the king prepared vigorously to curb the designs of Louis XIV for a universal monarchy. He sent Marlborough with 10,000 troops to protect the Dutch Netherlands, and even the death of William, and the accession of Queene Anne, who leaned to the Tory or peace party, could not avert war. William's last diplomatic work, the grand alliance (1701), with Austria and the Dutch Republic held good, and the elector of Brandenburg-Prussia joined the league on the understanding that he should receive the royal title in Prussia, as Frederick I.

The world was soon startled by the display of genius such as had never been seen in the campaigns of William III. Clogged, as he was, by the dilatory procedure of the Dutch, Marlborough effected little of note in the years 1702–03; but in 1704, when the Hapsburg forces were sore beset in South Germany by the Franco-Bavarian army, he resolved to march up the Rhine valley to the help of the Imperialists in Swabia. Skilfully misleading the French as to his intentions, he surprised the hostile forces near Donauwörth on the Upper Danube and clinched this success by a brilliant triumph at Blenheim, 13 Aug. 1704. A daring attack delivered across marshy ground against the French centre cut their array in twain, and drove thousands of fugitives into the Danube. Of an army 60,000 strong in the morning only some 20,000 survived uncaptured at night. Marlborough was able to effect little in the year 1705, when the interest centred on the brilliant though unsubstantial triumphs won by Lord Peterborough in Spain. In the campaign of 1706, Marlborough struck a decisive blow at the French army under Villeroi near Ramillies (23 May); the capture of Brussels, Ghent and Antwerp resulted from this victory, which also had the effect of lessening the pressure on the Imperialist leader, Prince Eugene, in Northern Italy. In 1707 the tide seemed to turn in favor of the French and Spaniards; the latter on 25 April gained a complete victory at Almanza, regained most of the eastern and northeastern provinces of Spain for the Bourbon cause. In July 1708, however, Marlborough utterly overthrew the French at Oudenard on the river Scheldt, and followed up his success by bringing the great fortress of Lille to surrender (December). These events laid the Spanish Netherlands at the feet of the allies and opened up a way into France.

Nevertheless, Louis XIV rejected their terms, and, making an appeal to his people, continued the war with fresh vigor, which was seen in his troops during the stubborn and murderous conflict at Malplaquet, 11 Sept. 1709. The skill of Marlborough and Eugene gained the day, but it was a barren triumph. The war dragged on for three years more; but the growing desire for peace in England, and the partisan intrigues which resulted in the recall and disgrace of Marlborough, brought it to a conclusion in the Peace of Utrecht, 13 March 1713. Great Britain secured Gibraltar and Minorca, Nova Scotia, parts of Newfoundland, districts around Hudson's Bay and the French part of Saint Christopher's. Spain, by what was called the Assiento Treaty, granted to her the sole right of importing slaves into the Spanish colonies of America. The Dutch retained their hold on most of the «barrier fortresses» of the Netherlands, and that territory along with Naples and the Milanese, went to the Hapsburg emperor, Charles VI. The traditional friendship of Great Britain and Austria warranted the hope that the Belgic Netherlands would, in Austria's hands, be safe from French aggression; and this was soon assured by Barrier Treaties. Philip V retained Spain and the Indies, Great Britain rather shabbily deserting the Catalans whom she had instigated to rise against the Bourbon ruler. The treaty was not one to be proud of; but it restored the balance of power and rendered impossible any further attack by Louis XIV on Great Britain and Holland. The phantom of an almost universal monarchy ceased to trouble the world until it reappeared a century later in the person of Napoleon. Further, this war of the Spanish Succession so far exhausted France, Spain and Holland, as to leave Great Britain mistress of the seas.

The accession of the House of Hanover in 1714 tended to embroil Great Britain in the political struggles of Central Europe. As electors of Hanover, the Georges were among the chief dignitaries of that venerable but decaying fabric, the Holy Roman Empire, and involved England in the disputes caused by the rivalry of the Houses of Hapsburg and Hohenzollern. The War of the Austrian Succession, which opened in 1740 with the seizure of Silesia by Frederick the Great of Prussia, aroused the sympathy of Britons with the young ruler, Maria Theresa of Austria; and when France joined the ranks of her would-be despoilers, Great Britain intervened in order to maintain her power as a counterpoise to that of France. George II, leading his troops in person, gained a victory over the French at Dettingen on the River Main, 27 June 1743; but two years later (11 May 1745) the British arms sustained a serious reverse at Fontenoy, near Tournay, where the genius of the Maréchal de Saxe prevailed over the stubborn valor of the British infantry. The Guards' Brigade retrieved the honor of the Union Jack by a splendid advance, which, if supported by cavalry, might have turned the fortunes of the day. As it was the defeat at Fontenoy and the romantic campaign of «Bonnie Prince Charlie,» grandson of James II, in Scotland, clogged British efforts on the continent with results disastrous to her allies. At sea, however, and in the colonies, the Union Jack was nearly everywhere successful, the capture of Louisburg (21 June 1745), leading to the reduction of Cape Breton Island and the opening of the Saint Lawrence to British attacks. But at Laffeldt near Maestricht, Saxe heavily defeated Cumberland's army of British, Austrians and Dutch (2 July 1747). In September the French took the fortress of Bergen-op-Zoom and seemed likely to overrun the Dutch Netherlands. Their fleets, however, were badly beaten by Warren and Hawke off Finisterre and Belleisle (May — October 1747). Both powers at length became weary of the war, and by the Peace of Aix-la-Chapelle (October 1748), agreed to restore their conquests — a clause deeply resented by British seamen and merchants, while the surrender of Cape Breton

Island to the French enraged the men of New England. France guaranteed the Belgic Netherlands to Austria, and agreed to dismantle the fortifications of Dunkirk. The balance of power was thus restored, both in European and Colonial affairs.

In 1756 Austria's grievance against Prussia concerning the Province of Silesia lit afresh the flames of war in Euorpe, Canada and India. Already France and Great Britain were practically at war in the valley of the Ohio and in the Carnatic, owing to the masterful policy there pushed on by Montcalm and Dupleix. Therefore, when France, reversing her traditional policy, allied herself with Austria for the partition of Prussia, Frederick the Great naturally became the ally of the Court of London (January 1756). At first matters went ill with the two Protestant States; Frederick could not at first make head against the coalition (joined by Saxony and Russia); and Great Britain lost Minorca, largely through Admiral Byng, who was executed. Matters did not mend until in June 1757, George II recalled to office the one inspiring personality in English public life, William Pitt. Acting on the principle summed up in his famous phrase — "I will win America in Germany" — he lavished subsidies on Frederick the Great. Slowly but surely the tide turned; Frederick's brilliant victory at Rossbach (5 Nov. 1757), over the French and their allies paralyzed the French government; and the results of favoritism and incompetence became apparent. The French navy was speedily worsted in several fights; Louisburg surrendered to Boscawen on 26 July 1758, and Prince Edward Island also fell to the Union Jack. Late in November British and Colonial troops captured Fort Duquesne on the Ohio and it was renamed Pittsburg. In India success was chequered with failure. By the victory of Plassey (23 June 1757), Clive had subdued Bengal; but after the arrival of French reinforcements, Count Lally, the successor of Dupleix, captured Fort Saint David and nearly took Madras. Gradually the pressure of sea power told in favor of Great Britain, and the long struggle for the possession of the Carnatic was decided by Eyre Coote's brilliant victory of Wandewash (22 Jan. 1760), which led up to the capture of the French stronghold, Pondicherry, a year later.

Meanwhile, though Frederick the Great was very hard pressed, his western flank was guarded by a mixed British-Hanoverian-German army ably commanded by the Duke of Brunswick. Great Britain meanwhile harried the coasts of France, completed her conquests of French colonies as well as those of Spain, when she drew the sword for France. Thus the British race reaped the full reward foreseen by Pitt. That statesman had the gift of choosing the right men; and his sagacity discerned in a young officer, Wolfe, the conqueror of Canada. The manner in which Wolfe captured the Heights of Abraham (13 Sept. 1759) is too well known to need description. Quebec and ultimately the whole of Canada were the fruits of a victory, which itself resulted from the ability of the mistress of the seas to attack when, where, and in what force she chose.

After the accession of George III to the throne, and of the Bute Ministry to power, the Anglo-Prussian alliance lapsed; but the war with France continued. By the (third) Bourbon Family Compact, Spain made common cause with her neighbor; but the British navy overbore all opposition at sea; and in February 1763, the Peace of Paris put an end to what had now become merely a maritime and colonial war. France ceded Canada, Cape Breton Island, Prince Edward Island, together with Grenada, Saint Vincent, Dominica and Tobago, as well as Senegal in Africa. Spain ceded Florida, but received from France as indemnity the great district of Louisiana. Great Britain restored to France several of her conquests in the East and West Indies, also to Spain parts of Cuba. Save that France handed back Minorca to England, the changes in Europe very slightly affected the Island Power; but she emerged, from what had been at first merely a continental war, the greatest of the world powers.

The completeness of her triumph brought its Nemesis. The American War of Independence furnished France with the longed-for opportunity for revenge. She declared war formally against England in 1778 after her volunteers had long been helping the colonists. Soon the maritime policy of her rival leagued together the northern powers in the League of the Armed Neutrals. The war, however, having been described in the article UNITED STATES — AMERICAN REVOLUTION, it is unnecessary to comment on it here, or to advert to the influence which sea power exerted on the decisive event, the surrender of Cornwallis at Yorktown (19 Oct. 1781). By the Treaty of Versailles (3 Sept. 1783), France recovered Senegal, several West India islands, acquired extended fishery rights on "the French Shore" of Newfoundland, and gained Tobago. Of all the wars between England and France that of 1778–83 was most completely colonial in character and in its results. Never before had France dealt her rival so serious a blow; but it recoiled on herself; for the ideas of liberty and civic equality which her soldiers learned in the land of Washington were now carried back to the mother country with results fatal to the Bourbon monarchy.

The Revolutionary War (1793–1802), stands apart from the previous struggles in that it was at the outset largely, though by no means wholly, a war of opinion. It turned mainly on the question whether the French Republic could with impunity set aside the rights of the Dutch republic over the navigation of the lower part of the River Scheldt, which Great Britain by the treaty of 1788 had undertaken to guarantee. The French in their resolve to make Antwerp a great port, persisted in ignoring that treaty; and matters were in a very strained state between England and France, when the execution of Louis XVI at Paris, 21 Jan. 1793, made all hope of compromise impossible. The French on 1 Feb. 1793, declared war against Great Britain and Holland. These powers therefore joined the first coalition (Austria, Prussia, "the Empire," Sardinia and Naples); but the jealousy of Austria and Prussia, the incompetency of the allied leaders and the enthusiasm and energy of the French soon drove the allies out of their territory. A British force was defeated at Hondschoote near Dunkirk, and had to retire toward Ostend (September 1793). To months later Admiral Hood's bluejackets and their Spanish and Neapolitan allies were driven from redoubts near Toulon; mainly owing to the skilful dispositions of Bonaparte, and had to abandon that seaport. The campaigns in Flanders languished owing to the paucity of the British forces, which had to leave the Low Countries early in 1795. In that year Prussia came to terms with France.

The coalition was shattered by the astonishing triumphs of Bonaparte in Italy (1796–97), which compelled Sardinia, Naples and finally Austria, to make peace. Holland and Spain, having become allies of the French, the war became solely maritime and colonial. Mutinies at Spithead and the Nore (April–June 1797), threatened to complete England's ruin; but the gloom of that year was brightened by the victory won by Jervis and Nelson over the Spaniards off Cape Saint Vincent (Feb. 14), by Duncan's triumph over the Dutch fleet at Camperdown (Oct. 11). Pitt's overtures for peace to the French government in August–September, came to naught. The scene of war then shifted to the Mediterranean where Bonaparte's great expedition captured Malta and Egypt, with a view to the eventual conquest of India. His schemes were thwarted by Nelson's brilliant victory near the mouth of the Nile (1 Aug. 1798); and the pressure of sea power received further illustration by a severe check administered to Bonaparte at Acre by Sir Sidney Smith's squadron. Britain put forth great efforts in India, where Wellesley's capture of Seringapatam early in 1799 led to the overthrow and death of that ambitious ruler, Tippoo Sahib; and after Bonaparte's secret departure from Egypt, a British expedition under Abercrombie and Hutchinson finally compelled the French army which he left behind to surrender (27 Aug. 1801). Malta had fallen to the British fleet in 1800.

Meanwhile, the aggressive conduct of the French government in Europe had enabled Pitt to form a second coalition which swept the French forces from Germany and Italy. An Anglo-Russian force in Holland, however, fared badly and finally had to leave the country (Oct. 1799). At the close of the year Russia left the coalition. In 1800 the allies lost ground rapidly. Bonaparte, virtually master of France after the *coup d' état* of Brumaire (Nov. 1799), overthrew the Austrians at Marengo (14 June 1800); Moreau completed their disasters at Hohenlinden in December, and the Court of Vienna came to terms with France early in 1801. Bonaparte with rare skill now prepared to turn the tables against England by effecting an alliance with Russia, and reviving the League of the Armed Neutrals. Again his aims were thwarted by Nelson, whose victory at Copenhagen (2 April 1801), paralyzed the league. The assassination of the Tzar Paul, and the accession of Alexander I, facilitated a compromise on maritime affairs; and the losses of the French in Egypt and Malta predisposed them to peace with England. Ultimately the belligerents came to terms in the Treaty of Amiens (27 March 1802), whereby England agreed to restore all her colonial conquests to France, Spain and Holland (including the Cape of Good Hope to the last-named), except Trinidad and Ceylon, which the Spaniards and Dutch, respectively, ceded to her. Malta was to be restored to the Knights of Saint John (on conditions which proved to be unworkable), while Egypt reverted to Turkey.

In the Anglo-French wars of the 18th century the importance of the commercial and colonial motives is increasingly apparent. The first two struggles originated in dynastic affairs relating to the then dominant principle of the balance of power; but the increasing solidity of the European states and the growth of commerce under conditions which were almost prohibitive to foreigners, turned the gaze of statesmen more and more to the new lands beyond the seas. The result may be estimated by reading over the causes and results of the wars here briefly set forth. Europe, after settling down on the foundations laid in 1713 and 1748, occupied less attention from statesmen at London and Paris. The French Revolution brought matters back sharply to the old field of debate between the two powers — the Netherlands; but when the weakness of the coalition and the genius of Bonaparte made France paramount on the Continent, the struggle quickly became one for supremacy in the Levant, and the East and West Indies. The vigor with which he played the rôles of Cæsar and Alexander the Great would have enabled him to wrest from England her world empire had he not been confronted by Nelson. Even so, the struggle between the secular rivals ended in 1802 on terms on the whole favorable to France; and it was soon clear that the first consul viewed the Peace of Amiens as an opportunity of strengthning the position of France in Euorpe, as well as her fleet and her colonies, in order to resume the struggle for empire under conditions far more favorable than Louis XIV had ever known.

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8. HISTORY OF THE 19TH CENTURY. The history of the British people in the 19th century is dominated by three facts or tendencies, themselves the outcome of its past history and its physical environment: (1) a portentous development of the national resources, resulting from the industrial revolution, improved agriculture, and the colonial expansion of the 18th and 19th centuries; (2) consequent collisions or friction with other growing nations, especially Imperial France and Imperial Germany; (3) a revolution of feeling in favor of peace, attention to domestic reforms and commercial expansion by pacific methods. These three phases of national life are closely related; the first is connected with the life of the 18th century of whose achievements — scientific and mechanical, military and maritime — it was the continuation. The second or warlike movement originated in the effort of an expansive but insular people to seek over-seas the material resources wanting at home, and prompted the efforts associated with the names of Nelson and Wellington, Dalhousie and Dufferin, John A. Macdonald, Parkes, Roberts, Kitchener and Cecil Rhodes. The third tendency, prudential or philanthropic in its origin, has as spokesmen Fox, Bentham, Shaftesbury, Peel, Cobden and Gladstone. The following brief sketch is not intended to be a commentary on these statements; but they may be regarded as sign-posts helping the historical traveler along paths which, though far from easy, yet frequently run on parallel or converging lines.

The first 15 years of the century witnessed a phenomenal development both of the material resources of Great Britain and of the strife with France — both of them well marked features of the previous years. In the years 1801–15 the inventions of Watt, Cartwright, Trevithick and George Stevenson led to an enormous expansion of the factory system and means of locomotion. But in those same years the material resources of the land were consumed in a struggle for national existence. The year 1803, which saw the renewal of war between England and France after the brief truce of Amiens, is marked by the exhibition of Trevithick's first locomotive. In the year of Waterloo (1815) Stevenson proved his Killingworth locomotive to be a practical success. The skill and expansive energies of man, which went to feed the flames of the great war, were also in large measure its cause. The rise of Napoleon to absolute power in France and his masterful interventions in neighboring states (especially in the Netherlands, where British rulers have never suffered a hostile military power to take root), his prohibition of British imports, and his endeavor to found a Colonial Empire at the expense of that of Britain brought about the mightiest of all Anglo-French wars, that of 1803–14. It is worthy of notice that the influence of the autocrat brought back the struggle from the sphere of opinion to that of material and colonial interests characteristic of the 18th century. The war had three well marked stages. Toward the close of 1805 Trafalgar left England mistress of the seas, while Austerlitz made Napoleon master of the Continent. In the next two years he strove to mass all the continental states against her in a commercial war styled the Continental System. Its pressure seemed to be bringing England to the verge of bankruptcy; but in 1808 the revolt of Spain threw open the Iberian Peninsula and the Spanish and Portuguese colonies in America to British trade. The defection of Russia in 1812 ruined Napoleon's prospects, and the subsequent campaigns (1813–15) assured the triumph of England and the overthrow of the great emperor. Her gains were colonial. Mauritius, Tobago and Saint Lucia were yielded up by France. For the Cape of Good Hope, Dutch Guiana and Curaçoa, conquered during the war, the victor paid to Holland a sum of £6,000,000. Malta, Heligoland and a protectorate over the Ionian Isles were the sole acquisitions in Europe from a war which added more than £600,000,000 to the national debt. The strain had been terrible and nothing but the new strength gained from the factory system, improved agriculture, and the mastery of the seas, could have brought the country through. Pitt, "the pilot who weathered the storm," died in 1806; but his heirs, the Tories, held on to power until 1830.

The burden of debt hung like a millstone round the neck of the nation for the next generation. In place of an income tax (then viewed as essentially a war tax) imposts were in and after 1815 placed on all possible articles, including foreign corn. Demonstrations and riots were the result; repressive measures, such as the Six Acts of 1819, were of no avail; and the unpopularity of George IV (1820–30) brought the monarchy itself into danger. Yet this time of malaise and political reaction was not fruitless. Canning, as Foreign Secretary, did much to thwart the reactionary policy of the monarchs who had framed the Holy Alliance, and his encouragement of the Liberals of Spain and of the Greek patriots led to notable results in the lives of those peoples, as also in the attitude of the United States toward Europe. (See Monroe Doctrine). The abolition of civil disabilities affecting Nonconformists in 1828, and the emancipation of Roman Catholics in 1829 with the reluctant assent of the Wellington ministry, showed that the days of privilege were over.

The event of the next year ushered in a new era. The death of George IV brought to the throne his far more popular brother William IV; and the general election, held during the excitement caused by the deposition of the elder House of Bourbon in the revolution of July 1830, in Paris, led to the return of a majority favorable to electoral reform at Westminster. After a long and acrid struggle the

Reform Bill of 1832 was passed. It enfranchised in all parliamentary boroughs householders paying a rental of £10, also copyholders in the counties. It disfranchised a number of very small boroughs and transferred their voting power to the new manufacturing towns and districts. Thus the influence exerted by the second French Revolution on English democracy was far more favorable than that of the first revolution. The anarchy and the wars resulting from that great upheaval put back the cause of parliamentary reform in England for 50 years. The seeming success of the second revolution (July 1830) now added vigor to the English movement which had meanwhile been strengthened by the silent yet potent changes in the distribution of population and modes of life resulting from the industrial revolution. That change, ever working with accelerated energy, necessitated the transference of power from the old rural England to the new manufacturing England; and thanks to the accession of William IV in 1830, and of Victoria in 1837, this momentous revolution took place peacefully. While breaking the power of the old Tory party, it rooted the monarchy more firmly in the hearts of the people.

The ensuing decades were times of great strain and stress, but they were met firmly and on the whole successfully. The wider sympathies and business aptitudes of the new Parliament showed themselves in the Factory Act (1833) of Lord Ashley — afterward Lord Shaftesbury; in the emancipation of slaves in British colonies, for which a sum of £20,000,000 was voted as compensation to the owners; and in the Poor Law Amendment Act of 1834 which cut at the roots of the growing evil of pauperism. Nevertheless the working classes of the great towns were in a state sometimes bordering on sedition, partly owing to resentment against the Whigs for refusing to extend the franchise laid down in 1832, and still more owing to the harsh administration of the new Poor Law. Trade depression, low wages, high taxes and dear corn swelled the volume of discontent. It took form in two well defined movements, Chartism and the Anti-Corn Law League, which, beginning in the year 1837, ran a parallel and competitive course, and ended in the year 1848, the former in failure, the latter amidst almost complete success. This difference in the fortunes of the two movements may be ascribed to the following causes. The Chartists, (q.v.) sought to cure evils, which sprang mainly from economic causes, by purely political means. The six points of their Charter were (1) annual Parliaments, (2) manhood suffrage, (3) equal electoral districts, (4) payment of members of Parliament, (5) abolition of the property qualification for members of Parliament and (6) vote by ballot. This program (a revival of the advanced Whig program of 1780) aimed at benefiting the working classes through Parliament. The Free Traders sought to benefit them by altering taxation so as to let in free, or nearly free, the necessaries and small comforts of life. Further, Chartism suffered from the unwise means used by the physical force wing of the party whose leaders fell out with one another. The Free Traders on the other hand had excellent leaders, Cobden and Bright, whose arguments finally brought over to their side large numbers of the workingmen and the Prime Minister himself, Sir Robert Peel.

This able man had pieced together the Conservative party from the more malleable of the fragments of the old Tory faction; and, largely owing to the failures of the Whigs in finance, he came back to power after the general election of 1841 with a strong and apparently homogeneous following. His openness of mind soon brought him into collision with very many of his followers. He became a Free Trader, while they remained Protectionists. He soon came to see that the long series of deficits could be ended only by recourse to direct taxation; and in his budgets of 1842 and 1845 he abolished or greatly lessened duties on large numbers of articles, making good the temporary loss by an Income Tax of 7d in the £. He also lessened the sliding scale duties on foreign corn. The result was seen in improved trade and in a decline of pauperism and misery. In 1845–46 the Irish famine brough him to sacrifice the corn duties — a measure which earned him unmeasured abuse from Disraeli and Lord George Bentinck and the gratitude of the poor throughout the whole kingdom. Thus the working classes gained their chief aims through the efforts of the Free Traders and the legislation of Peel. Consequently when the continental revolutions of the spring of 1848 induced the physical force Chartists to copy the methods which had been successful in Paris, Berlin and Vienna, the result was a ludicrous fiasco, which brought Chartism as an organized movement to an end. The spirit that had animated its best leaders, namely a burning love of freedom and a passionate desire for the moral and mental uplifting of the working classes, lived on in those Radical parsons, F. D. Maurice and Charles Kingsley, in the second founders of the Co-operative and Friendly Society movements, and in the later Radicals, who by wise methods soon gained four of the six points of the Charter. The same yearnings after ideals far other than those realisable by mere party strifes and sordid commercialism permeated much of the best work of Carlyle and of his young disciple Ruskin, and throbbed in the youthful poems of Tennyson, Browning and Swinburne.

The decade of the forties, marked by political discontent, but dignified by ideal aspirations in all spheres — the disruption in the church of Scotland, the Anglican movement in the church of England and the pre-Raphaelite movement in art, belong to that momentous epoch — faded away into a period marked by expanding trade and mental quiescence. Gold discoveries, railways, steamships, these were the chief preoccupation of mankind; and under their subtle alchemy democracy and idealism of all kinds vanished for a time, both in England and on the Continent. As often happens in these expansive epochs (which recur after the introspective, critical and reforming epochs), a collision occurred with another growing power, Russia. The Crimean War resulted largely from the efforts of that stern autocrat, the Tsar Nicholas I, to browbeat the Turks, whose political power was then thought to be essential to the security of the overland route to India. The hope entertained by the British nation that the Sultan would reform his government and grant religious liberty soon proved to be vain; and England came to see that she had championed a moribund cause. She gained nothing by the war; and its first reverses did much to promote the ferment in native circles in India which led to the terrible mutiny of 1857.

Affairs in Europe soon engrossed public attention. In the Crimean War, England had had the alliance of Napoleon III of France and of Victor Emanuel II of the Kingdom of Sardinia. Her relations with the French emperor speedily cooled; and complications in the years 1858–59 brought the two people so near to a conflict as to lead to the revival of the volunteer movement. Far different was the attitude of the nation toward the Italian movement for liberation and unity. The masterly statecraft of the Piedmontese statesman, Cavour, and the heroic deeds of Garibaldi in southern Italy in 1860 aroused the keenest interest. The diplomatic help given by British statesmen, Palmerston and Lord John Russell, then laid the basis of that friendship which has since subsisted between Great Britain and the United Kingdom of Italy.

Amidst these excitements Cobden did good service by promoting a commercial treaty between England and France on free trade lines, (it held good for the years 1860–70) and Gladstone, the Chancellor of the Exchequer, by his budgets of the early sixties succeeded in further cheapening the necessaries of life. But no advance was made on purely political lines, firstly because the influence of Palmerston, the Prime Minister, barred the way, and secondly because popular interest centred largely in the wars of that troubled period — the American Civil War (which at one time portended a strife between the two kindred peoples), the Danish War of 1864, and the Austro-Prussian War of 1866. The end of this last struggle brought a lull which favored the hopes of reformers. The death of Palmerston on 18 Oct. 1865, had removed another barrier; for, since the death of the Prince Consort at the close of 1861, his influence in the political world had been almost without bounds. Other causes now helped to turn attention to home affairs. The cattle plague and the sharp financial crisis of the year 1865, the Fenian outrages of the next year, and the general state of malaise throughout the United Kingdom brought men once more to that critical or introspective mood which is favorable to political reform. A singular concatenation of events brought into office in June 1866 a Conservative Ministry headed by Lord Derby and Mr. Disraeli — into office but not into power, for they were face to face with a hostile majority, irritated by the recent rejection of a moderate Reform Bill championed by Lord John Russell and Mr. Gladstone. The result was a series of acrobatic performances whereby Disraeli, erstwhile the denouncer of the inconsistencies of Peel, foisted on his party in 1867 a measure far more democratic than that of the previous year. Household suffrage was thenceforth the law of the land for all parliamentary boroughs. After a short time of uneasy balancing, the Conservative Ministry was overthrown by the general election of November 1868.

Democracy now came in as with a flood. The Gladstone Ministry (December 1868 — February 1874), carried legislative activity to lengths never before seen in England. The disestablishment of the Irish church (1869); the Irish Land Act and the Elementary Education Act (1870); the abolition of the system of purchase in the army, and the appointment of the Local Government Board (1871); the Ballot Act and Licensing Act (1872); the Supreme Court of Judicature Act (1873) — these were the chief measures passed in this period, which witnessed also the settlement of the Russian claims respecting the Black Sea and the Alabama claims urged by the United States. In these matters, as in the sphere of foreign policy generally, the Ministry was deemed to have sacrificed British interests needlessly.

The outcome of this feeling, and of the alarm felt by many classes at home whose interests were injured or threatened, was seen in the general election of February 1874, which marked a sharp reaction in favor of Imperialism and a spirited foreign policy. Disraeli (created earl of Beaconsfield in August 1876) came back to power at a time when the Eastern Question entered on an acute phase. The years 1875–78 were overshadowed by the atrocities committed by the Turks on their Christian fellow subjects, and by the Russo-Turkish War. Sharp differences of feeling were caused by Lord Beaconsfield's treatment of these events, as also by his acquisition of Cyprus (June 1878). Depression of trade at home and the outbreak of wars in Zululand and Afghanistan in 1879 made the Ministry more and more unpopular, with the result that the election of March 1880 brought back Gladstone to power with a large majority. His second ministry (April 1880 — June 1885), coincided with a time of great ferment in Ireland and of unrest abroad, with which he coped manfully but not very successfully. Irish affairs were not settled by his drastic Irish Land Act of 1881; his very large concessions to the Boers of the Transvaal in 1881 and 1884 aroused a most bitter feeling among loyalists in South Africa and sowed the seeds of future trouble. British intervention in Egypt (1882) was successful, but had as an unfortunate corollary the despatch of General Gordon to Khartum; and the dealings of the Ministry with Russia respecting the Afghan frontier at Penjdeh, as also with Germany respecting various colonial questions on the coasts of Africa and New Guinea, were marked neither by foresight nor firmness. In the midst of these disturbances Gladstone, with characteristic tenacity, pushed through the Reform Bill of 1884 and the Redistribution Bill of 1885 in face of prolonged opposition from the Lords. The former measure extended household suffrage to the counties; the latter divided the whole country into electoral districts with some approach to numerical equality.

The general election of 1885 was of singular interest as marshaling the revivified forces of Democracy and Imperialism. The former won, thanks to the votes of the newly enfranchised agricultural laborers; but the triumphant Liberal party was split in twain by Gladstone's Irish Home Rule Bill and Land Bill (April 1886). The general election of July 1886 reversed the decision arrived at 18 months earlier, and Lord Salisbury took office with a Unionist Ministry which sought — as he phrased it — to govern Ireland "honestly, consistently and resolutely." It also passed the local Government Bill (1888) the Irish Land Purchase Bill (1891) and strengthened the army and navy, and adopted a firmer tone on foreign affairs. In 1892 the swing of the pendulum brought Gladstone back to power — for the fourth time,— but in 1894 he retired and Lord Rosebery undertook to reconstitute the ministry. Even his versatility failed to solve the difficulties arising from disunion in the cabinet and in the Liberal party, and from the tension in public opinion caused by massacres of Christians in Armenia and Crete. He resigned in 1895, and the ensuing elections brought back the Unionists to office with a majority larger than had been known since 1832. Lord Salisbury's new ministry, which included some Liberal Unionists, had to grapple with a succession of difficulties — the Venezuelan affair, complicated by President Cleveland's message, Doctor Jameson's raid in South Africa, complicated by Kaiser Wilhelm's famous telegram, oppression and anarchy in Crete and many parts of the Turkish empire, and the campaign against the Dervishes on the Upper Nile. To these matters we cannot advert. We can point out here only two chief facts in the political history of the century — the gradual effacement of the old party lines, and the curious periodicity in the political life of Great Britain. To dwell on the latter of these, it is clear that the main tendency has been toward democracy and industrial development by peaceful means — a tendency dominant in the periods 1816–1848, 1866–1874, 1880–1886, 1892–1895. The intervening years were marked either by the quiescence which comes naturally after great constructive efforts, or by the striving after national security and the consolidation of the empire which results inevitably from the insular position and expansive force of a virile people. The century closed, as it began, amidst what may be termed the imperial impulse, of which industrialism has been the unconscious but all powerful feeder. The era of great production, coinciding as it does with one of militarism and protection on the Continent of Europe, imposes on England the need of looking and living beyond the seas to an extent unimaginable to the men of Nelson's generation. In this dualism of her interests, democratic and imperial, lies the great problem of her political life — a problem never to be solved but ever keeping her faculties tense and keen. A word must be said on the development of Socialism in Great Britain. It took a new start in 1881 with the foundation of the «Democratic Federation,» which in 1883 became openly Socialistic. Mr. Henry George's book, «Progress and Poverty» (1881) excited some attention, as did the author's lectures during a visit to England in 1884. But neither his theories on the land nor the more systematic Socialism of Karl Marx had a permanent effect on British workmen, who, certainly up to 1900, preferred to act through Trade Unions and Co-operative Societies for their own betterment. The Profit Sharing Movement also brought them into closer touch and sympathy with many employers, who adopted that system.

Bibliography.— We can name here only a few of the chief works dealing with the outstanding events of British political life and with the men who made history in the 19th century. Besides the text books on the English history of the period written by Doctor Bright and Doctor Gardiner; there are 'History of England — 1800–1815' and 'History of the Thirty Years' Peace — 1816–1846' by Harriet Martineau; 'History of England from 1815' (6 vols.) by Sir Spencer Walpole (continued up to 1900); 'A History of Our Own Times' by Justin McCarthy (continued up to 1900, 4 vols.); 'Social England' (vols. V and VI) edited by Doctor Trail; 'The Political History of England,' Vol. XI (1801–1837) by Hon. G. C. Broderick and J. K. Fotheringham; Vol. XII (1837–1901) by S. J. Low. Also the following biographies: 'Pitt' by Lord Rosebery (1 vol.) also by J. H. Rose (2 vols.); 'Life of Nelson' by Captain Mahan (2 vols.); 'Life of Wellington' by Sir Herbert Maxwell (2 vols.); 'George Canning' by H. W. V. Temperley; 'Peel' by J. R. Thursfield; 'Life of Palmerston' (1846–65) (2 vols.) by Hon. Evelyn Ashley; 'Life of Lord John Russell' by Spencer Walpole (2 vols); 'Life of Cobden' and 'Life of Gladstone' (3 vols.) by Lord Morley; 'Life of Lord Granville' by Lord E. Fitzmaurice (2 vols.); 'Life of Lord Randolph Churchill' by Winston Churchill (2 vols.); 'Life of Disraeli' by Monypenny and Buckle; H. Paul, 'History of Modern England' (to 1895) (5 vols.); 'Reign of Queen Victoria' by T. H. Ward; 'John Bright,' by G. M. Trevelyan (2 vols.); 'Sir Stafford Northcote,' by Andrew Lang (2 vols.); 'The Cambridge Modern History' (Vols. X–XII).

J. Holland Rose,
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9. THE POLITICAL PARTIES — TO 1906. Party government begins, in primitive society, with the struggle for power, the nature of which is determined in each case by local and tribal conditions, and by the influence of men who are or aspire to be leaders. At a later stage, when abstract logic is applied to questions of policy, the parties begin to argue from principles; they profess themselves friends of the people, friends of the better class, and so forth. The principles invoked are not scientific propositions; they are rather forms of language, such as are received with favor in a mixed assembly; the party-leader uses them so as to combine opinions and interests, to draw together a working majority. Each party borrows freely what seems to be effective and popular in the program of its opponents. Moderate men of all parties think very much alike; they are kept apart by the personal struggle for power.

These general truths are well illustrated by the contest between Whigs and Tories in the 17th century. The Whigs were an aristocratic party, relying on the nobles, the landed gentry, and the city of London. Their principle was, the supremacy of the law: they were determined that the courts which administer the law and the high court of Parliament which makes the law, should be freed from the arbitrary interference of the king. Moderate Tories did not undervalue the law; they argued that by law the king was entitled to obedience, and that the king then reigning had done nothing to forfeit his claim. The Whigs carried their point in 1688, by bringing in a foreign king, William of Orange, a capable, magnanimous man, not less firmly attached to his royal prerogative than the Stuart kings had been. With the advent of the House of Hanover in 1714, Whig principles came once more to the front; for the first George and his son were Germans; they needed an interpreter between the king and the people; and the statesman who could manage the House of Commons was not, like Strafford or Clarendon, dependent on the support of his royal master. George III on the other hand was a patriotic Englishman; he thought himself strong enough to choose his own ministers and to throw off the yoke of the Whig nobles. If he had possessed the administrative talent of Fredrick the Great he might have made himself the head of the government and set himself above the parties. But King George was neither a great statesman nor a great soldier; he relied too much on the smaller arts of political management; and in the middle of his long reign he came under the influence of a minister whose commanding character excluded the king from the personal conduct of national business. It is to Pitt that we owe the outline of our modern constitution. At Windsor he was the servant of the Crown, arguing, often in vain, against the obstinate purpose of his master. In the cabinet he was himself master; he chose his colleagues, and dismissed them when they opposed his policy. In the House of Commons, which was still an aristocratic body, his ascendency was never seriously disputed, and he filled the House of Lords with peers of his own creation. So it was that Pitt, by birth and training a Whig, became the founder of the new Tory party.

Pitt's opinions were those of an official Liberal. He wished to reform the electoral system, to remove religious disabilities, to relax the rigor of laws which prevented the expansion of trade. But the fates had imposed upon him the task of steering the ship of State through a period of wars and revolutions: the work of reform was postponed to the necessities of foreign and domestic policy. When the great minister died, his unfinished schemes fell into the hands of men with whom postponement was a settled habit. During the long Tory administration of Lord Liverpool there was, in principle, but little difference between the parties. The middle classes were impatient, and some of them joined the workingmen in declaring that neither of the aristocratic parties could be trusted. These independent men called themselves radical reformers, and they sympathized with the aspirations of democracy in America, in Ireland, and on the continent of Europe.

The Reform Act of 1832 was a Whig compromise; it failed to satisfy the Radicals, but it gave them a foothold which they never lost. It was indeed the first attempt to apply abstract principles to the English constitution, and it started a momentous process of change. Tradition was dethroned, and the old party names had become unpopular. The Whigs began to call themselves Liberals, a name which some of them declined, because it suggested humanitarn tendencies with which they were not in sympathy. Macaulay, for example, would not call himself a Liberal, because, as he said, he was in favor of «war, church establishments, and hanging.» The Tories in their turn became Conservatives; they accepted the results of 1832, but deprecated any further change in fundamental institutions. The Radicals of that day were middle-class men, disciples of Bentham; they stood for cheap government, freedom of contract and individualism. Socialism made its appeal to the unenfranchised laborers, but as yet without much visible success. The Factory Acts, for example, were carried by Tory humanitarians, against the opposition of Radical manufacturers. Free trade, when it came, was the work of a Conservative administration; the Liberals approved; the older Whigs, like Lord Melbourne, thought that Peel had betrayed the landed interest. Lord Derby, a hereditary Whig, was carried over to the conservative Tories by his fears for the Church and his dislike of free trade.

The conflicting tendencies of the half-century after the first Reform Act are summed up in the careers of two men who were to take a leading part in the transition to democracy. Disraeli entered life as a Radical; he was always hostile to the Whig oligarchy. His sympathies were with the Tories; his father, a quiet scholar, had taught him to take the side of the Stuart kings, and to regard the old nobility as the true leaders of the people. If Peel had given him office, he might have become an orthodox Conservative; but the leaders of that party had no place for an able Jew, who lacked the public school and university stamp. Disraeli took his revenge by attacking Peel and his free-trade policy; his merciless wit gave him the ascendency, even with men who still distrusted him; he gained the confidence of Lord Derby, and in alliance with him began the construction of what was really a new party, the party of Tory democracy. In 1867 the new Tories took their famous «leap in the dark» by establishing household suffrage in the boroughs. The immediate result was a crushing Liberal victory; but in 1874 the forces of Tory democracy were strong enough to place their leaders in power. Six years later the pendulum swung back and Mr. Gladstone was once more supreme.

Lord Beaconsfield died in the moment of defeat, but his genius presides over the party which he formed, and profoundly affects the mind of the nation. He never concealed his belief that the conduct of public affairs, especially foreign affairs, must be left to sovereigns and statesmen. At the same time he was always in sympathy with the aspirations of the workingmen. He was the only public man of his generation who perceived that Benthamite Liberalism was certain, sooner or later, to become unpopular, and he prepared the way for that modified socialism which is now the accepted creed of both parties. And again he perceived that Englishmen, without distinction of class, are conscious of their position as an imperial power, and determined to maintain it. Disraeli himself, in his earlier days, had taken the narrower views of England's responsibility to India and the colonies; his later speeches are full of the sentiment of empire. Englishmen are all (to some extent) socialists now; and are all (in one sense or another) imperialists.

Mr. Gladstone began his career as the rising hope of Oxford Toryism. He was honestly afraid of Radicalism; he distrusted the Whigs; the mission of the Tory party was to «maintain truth» by supporting the Church of England. At the age of 30 he published his book on 'The State in its Relations with the Church' — a noble vindication of the Church as a spiritual society, pledged to maintain her conflict with sin and selfishness, a society to which the support of the state is not essential, but may, under proper conditions, be useful. It was in the interest of the state that Gladstone argued for the establishment and endowment of the Church. His argument was coldly received; the qualified approval of Peel, the scornful criticism of Macaulay, began to work a change in Gladstone's political mind. No criticism touched his ideal; but in the present age of the world the ideal was, perhaps, unattainable. If Whigs and Conservatives were equally unable to rise to his conception of the Church, if the price of establishment was to be subordination to the state, what then? The Church, to preserve her freedom and purity, might withdraw from the alliance, surrendering those of her privileges which might be found inconsistent with abstract political justice. Within a few years after the publication of his book, Mr. Gladstone was discussing the possible advantages of disestablishment.

Sir Robert Peel was not pleased to see an able young party man so preoccupied with ecclesiastical questions. He drew Gladstone into his ministry, placed him at the Board of Trade, and worked him very hard. In the transition to free trade, master and pupil moved steadily together. While Peel was leader there could be no doubt as to Gladstone's party connection; when that guiding influence was removed he was carried about by various kinds of doctrine. Though more than half a Liberal, he was still afraid of Radicalism. He approved of Lord Palmerston's passive resistance to the extension of the franchise, but this was his only link of sympathy with the coming leader of the Liberal party. There was much agreement between Gladstone and Lord Derby; both were Oxford Tories and devoted Churchmen; but by this time Lord Derby was identified with Disraeli, and the Peelites would not serve under the man who had planted so many barbed arrows in the sensitive spirit of their chief. After long hesitation, Mr. Gladstone threw in his lot with the Liberals. In June 1859 he supported Lord Derby in a critical division; 10 days later he took office under Lord Palmerston.

As a member of a Liberal government, Gladstone stood committed to parliamentary reform. His Whig colleagues discovered with alarm that this late convert was not merely a reformer; he was a democrat. He declared, from the Treasury bench, that the laboring class had a moral right to come within the pale of the constitution. There was now only one link between the Liberal champion and the Toryism of his youth; he was still member for the University of Oxford. That link was severed when the University rejected him in 1865. Mr. Gladstone appealed to the people of Lancashire, and entered on the first of those oratorical campaigns which were to change the face of English politics.

The franchise question was settled, for a time, by the Tories in 1867, and the popular vote of 1868 was a personal vote for Mr. Gladstone. With a wide and varied electorate, and many interests competing for notice, the people are easily persuaded to accept the supremacy of one man, who, like General Jackson, «acts always for the good of the country.» Under such conditions the leader of opposition, if he knows his business, has his rival at a disadvantage. It is the men in power who have to make terms with foreign governments and to protect the national purse; however well they do, it is always easy to show that they might have done better. Mr. Disraeli made good use of his opportunities, and in 1873 the tide of Liberal success was ebbing rapidly. Mr. Gladstone was alarmed, and he would fain have made his defeat on the Irish University question an excuse for bringing his opponents into office. Disraeli saw the snare and avoided it, and the wisdom of his tactics was justified by the Conservative victory of 1874. As a leader of opposition, Mr. Gladstone disregarded what were then supposed to be the conventions of party life. He retired from responsible leadership; returned to the field just at the moment when his action was most likely to embarrass his successors; and finally presented himself to the country as a candidate for power. In the election of 1880 his success was complete, and the death of Lord Beaconsfield left him without a personal rival. But once more the tide ebbed as rapidly as it had risen. In a few years it became evident that the Liberal party was hopelessly divided on three issues of cardinal importance — disestablishment of the Church, Home Rule for Ireland and the scheme of modified socialism advocated by Mr. Chamberlain. Old badges and cries were out of date. Mr. Parnell was forming an Irish party, so severely disciplined that no member of it could break away or disobey orders. For a few eventful months there was also a fourth party, a small band of Tories who obstructed their own leaders, addressed themselves in a democratic spirit to the conservative rank and file and made themselves so strong that in 1885 Lord Salisbury was compelled to take them into partnership.

At the general election of 1885 Mr. Gladstone endeavored to keep his party undivided by postponing all troublesome questions. He did not declare against Home Rule, but he pointed out the danger of allowing Mr. Parnell to hold the balance of power. This was his reason for asking the country to give the Liberals a majority large enough to make them independent of the Irish vote. In the event, parties were so distributed that the Conservatives and Parnellites, if combined, would be equal or superior in number to the Liberals. Mr. Gladstone accepted Home Rule. It would be quite unfair to represent his conversion as a bid for power and nothing more. The argu- both for Home Rule was a strong one, and both the great parties were studying it in a practical spirit. But with all his vast experience of affairs, Mr. Gladstone was subject to illusions. He believed that the Irish demand, as presented by him to the electors of England and Scotland, would prove to be irresistible. In this belief he cashiered those of his supporters who refused to follow, and when the House of Commons rejected his proposals, he hurried on a «penal dissolution» and went again to the country. The «classes,» he said, were against him; he appealed to the «masses.» The masses responded by placing the Unionists in power.

In the Parliament of 1886–92 the Liberal Unionists occupied a position somewhat analogous to that of the Peelites in 1850. They were stronger in ability than either of the great parties; they sat on the Liberal benches and co-operated steadily with the Conservatives. Lord Salisbury in office did himself no discredit; but he had to make himself responsible for unpopular measures. The Crimes Act of 1887 was in itself a moderate measure. but it was a deep disappointment to many who had begun to hope that Ireland might be governed without repressive legislation. A good many independent Liberals fell quietly into line with their old party; the swing of the pendulum was felt. In 1892 Mr. Gladstone became Prime Minister for the fourth time, and entered buoyantly on the task of framing a second scheme of Home Rule. When the scheme appeared his party saw plainly that it was not an improvement on the bill of 1886. Discipline was maintained; the bill of 1893 was carried through the House of Commons and it was darkly intimated that the House of Lords must accept it or take the consequences. The Lords rejected the bill by a very large majority. Mr. Gladstone was at the end of his physical resources; he was followed by Lord Rosebery, who, however, was not the man to succeed where the old leader had failed. The election of 1895 vindicated the shrewd forecast of the Lords and restored Lord Salisbury to office.

From this time forth the Liberal Unionists were identified with the Conservatives; but in consenting to share the spoils of victory they did not withdraw the Liberal or Radical opinions which they had professed. Mr. Chamberlain, for example, did not withdraw his objection to church establishments; but he could not, of course, give effect to his opinion so long as he retained his connection with the Unionist party, which is pledged, as a party, to the defense of two established Churches. On that question no difficulty arose, but, at the height of its success, the party was broken up by the tariff controversy initiated by Mr. Chamberlain's attack on "one-sided free trade" in 1903. As conceived by its author, the plan of modified protection had two aspects, socialist and imperialist. It aimed at securing constant employment for the British workingman, and at consolidating home interests with those of the colonies by means of preferential tariffs. The plan was advocated in a series of speeches which could hardly be excelled for clearness and force; but the electors were not convinced. In January 1906 the fiscal question held the field; and free trade carried all before it. The Unionist party was left in a helpless minority; its leaders found comfort in recalling the precedents of 1841, 1874 and 1886 — the years in which the Conservative party recovered its ground after an apparently crushing defeat.

The new government was supported by the Whig Liberals and by the Radicals, who combine Manchester (free trade) doctrines with modified socialism as best they can. In former Parliaments, Labor members were few, and voted with the Liberals. They still prefer Liberals to Unionists, but their support is given in return for concessions which put a strain on the Liberal members of the Cabinet. On Irish questions, the Nationalists voted with government, on the understanding that Mr. Gladstone's policy would be revived at an early date; but where Catholic schools are concerned that vote is hostile to the educational policy which commends itself to most Liberals. The Unionist opposition was seriously embarrassed by differences of opinion in regard to free trade. Amid these currents and cross-currents the leader had to steer the best course he could. We still defer to the notion that there are two great parties in the state; but the House of Commons has in fact become a collection of groups, like the Reichstag or the Chamber of Deputies.

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10. THE POLITICAL PARTIES 1906–18.

With the accession of the Campbell-Bannerman (q.v.) administration in January 1906, the Liberty Party returned to power after nearly 20 years' political exile. Excepting for two short spells of one year and two years the Conservatives, joined by the Liberal Unionists, had been in power since 1886. The so-called "khaki election" of 1900 had kept the Unionists in office to carry on the South African War, to which most of the Radicals and Laborites were bitterly opposed. The late Lord Salisbury had resigned in 1902 and was succeeded by his nephew, Mr. Arthur James Balfour, who carried on the government till December, 1905, when he in turn resigned with his cabinet. Rent asunder over the fiscal or "tariff reform" question, the Unionist party was said to be suffering from "senile decay" and the country was only too willing "to give the other side a chance." Sir Henry Campbell-Bannerman came in with an overwhelming majority. The Liberals captured 379 seats out of the total of 670; the Unionists only had 157. In addition, the government had at their disposal the votes of 51 labor members and 83 Irish Nationalists. Though a pronounced Home Ruler, the new Premier did not touch the thorny problem of Irish separation during his tenure of office. The two previous Liberal administrations had been shattered on that rock. He introduced several highly contentious measures which were promptly killed by the House of Lords. Yet his brief administration (he died in 1908) was marked by some daring and really useful acts of legislation; he settled a very old controversy of many years' standing by passing the Deceased Wife's Sister Act in the teeth of fierce clerical opposition; he introduced a court of criminal appeal — a much-needed measure; created a public trustee; a system of probation for juvenile and first offenders; a protective patents act, and a merchant shipping act. The Liberals undoubtedly possessed a set of brilliant and enthusiastic leaders in Mr. Asquith, Mr. David Lloyd George, Mr. Winston Churchill, Mr. (now Viscount) Haldane, Mr. (now Lord) Morley and Mr. Birrell. Beyond offering destructive criticism the feeble opposition could exert a very limited influence over what they called the "socialistic orgy" of the Radicals, a generic title applied to the heterogeneous party then in power. Mr. Asquith succeeded to the the premiership shortly before the death of Sir Henry Campbell-Bannerman. Opinion differed little about Mr. Asquith: a cool, clever, strong and determined man possessing little imagination and no illusions. His predecessor had held the party and its allies together with amiable tact; Mr. Asquith dominated by sheer force of a commanding personality. He was ably seconded by the Chancellor of the Exchequer, Mr. Lloyd George, the fiery little Welsh lawyer and orator who, but a few years before, had been the "best hated man" in the United

Kingdom. In 1900 the latter had had to adopt the disguise of a policeman to escape from the threatened violence of an infuriated mob in Birmingham. Also a convinced Home Ruler, Mr. Asquith realized the futility of introducing any measure of Home Rule for Ireland while the Lords possessed the power of the veto. He at once opened a campaign to deprive the Lords of that power. Needless to say, he had the hearty support of the whole Liberal, Labor and Nationalist members, and the most strenuous opposition of the Conservatives and Liberal Unionists. The two latter parties, now fully united, forced a general election in January 1910, when the government's big majority melted away; from 513 it fell to 124 all told. The Irish Nationalists and the labor parties now had the government in their power; nor did thev fail to press their demands. The bill of the Parliament Act (see article II PARLIAMENT) was introduced in April 1910. Numerous conferences on the subject between representatives of both houses failed to produce an agreement, and Mr. Asquith again appealed to the electorate in December of the same year. The result of the election was that his majority rose by only two; the same number of Liberals were returned as Unionists, namely, 272, and the government was now entirely dependent for its existence upon the Irish and labor votes. The Parliament Act Bill was reintroduced in February 1911 and passed by the Lords, and the road to Home Rule lay open. As the «Osborne judgment,» upheld by the highest court, had deprived the trade unions of the right to pay the salaries of labor members in Parliament, every private member of the House of Commons was voted a salary of $2,000 per annum. The Unionists vehemently opposed the measure, and a number of them have never accepted the payment. By this means were the Liberals, Laborites and Irish Nationalists welded into one party pledged to mutual support. Profiting by the example of their opponents, those Liberals who seceded from their party over the Home Rule splits of 1886 and 1893, and retained the title of «Liberal Unionists» though acting always in accord with the conservatives, have since gone over entirely to the latter and amalgamated with them. Hence the two parties were simply styled «Unionists,» i.e., pledged to maintain the union between Great Britain and Ireland. Home Rule was definitely passed in 1914, but its operation was postponed pending the duration of the war. See IRELAND.

The outbreak of the European War took the British public and politicians wholly by surprise. Entirely absorbed in their internal — and internecine — affairs and party quarrels, they had failed to observe the war clouds gathering on the horizon. Only a few days before the storm broke the king had told the warring factions summoned to Buckingham Palace that the «cry of civil war» was «on the lips of the most responsible and soberminded of my people.» No sooner, however, than the European situation assumed a serious aspect, the Unionist opposition displayed a magnanimous sentiment of patriotism by declaring their whole-hearted support of the government in the face of possible perils from without, an attitude entirely contrary to that adopted by the Liberals over the South African war in 1899, when the Unionists were in power. Party strife and criticism disappeared as by magic in August 1914; the Premier's motions for a vote of credit for £100,000,000 for war purposes and for the immediate addition of 500,000 men to the army were carried in the House of Commons on 6 Aug. 1914 without a dissentient voice. With equal promptness and unanimity both Houses of Parliament passed through all their stages a series of emergency acts of Parliament, the most important of which was the Defence of the Realm Act. The life of a Parliament having been reduced from seven years to five years by the Act of 1911, a general election was consequently due in 1915, but was postponed owing to the war. As a substitute a Coalition Ministry was formed in May 1915 and nine Unionists were admitted to the Cabinet of 22. The number was raised to 10 in August 1916 by the appointment of a Unionist (Mr. H. E. Duke) as Secretary of State for Ireland in succession to Mr. Birrell, a Liberal. The Coalition Ministry collapsed unexpectedly on 6 Dec. 1916. Mr. Asquith resigned and was succeeded by Mr. Lloyd George, who formed a special cabinet of five members for a more vigorous prosecution of the war. The Cabinet was composed of two Liberals and three Conservatives (Unionists). In November 1917 the War Cabinet was reconstituted by the addition of two members, one being the Boer general, Jan C. Smuts, of South Africa.

It may not be out of place here to draw a comparison between the two historic political parties of Great Britain. The Liberals or «Whigs,» as they were formerly called, have always been strong on domestic affairs and social legislation. While they were generally weak in the management of foreign affairs, they possessed a remarkable faculty for setting the people by the ears and promoting class antagonism by raising inflammable issues. Measures such as church disestablishment, education bills, licensing, socialistic taxation, etc., generally formed the main planks in their platform. Idealistic and frequently impractical, they were opposed, on principle, to the maintenance of «bloated armaments» and sought by all means to keep expenditure on the navy and army as low as possible. The Conservatives or «Tories,» on the other hand, invariably pursued a strong — if sometimes mistaken — foreign policy and believed in the efficiency of an overwhelmingly strong navy. In legislation they generally left the people, as well as established systems, customs and laws as much as possible alone. Since about 1908 there has grown up among the British people an increasing discontent with regard to the party system. Many public men and journals have condemned it as a «farce,» a «make-believe» and a «hollow sham,» and a general opinion was entertained that the end of the European War would undoubtedly herald some revolutionary changes in British politics.

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11. PARLIAMENT. The British Parliament has its roots deep in the past. It has legislated continuously for a period of more than 600 years, a record unapproached in the history of the world. It has been developed by successive stages from the Great Council of the Norman and Angevin kings. Much of its ceremonial dates from Plantagenet times. The foundations of this procedure are imbedded in Elizabethan journals. It holds its sittings in a royal palace, which, though for the most part modern in its structure, is venerable in its associations. The new palace yard, through which members of the House of Commons hurry to their daily duties, is the yard of the new palace which William Rufus built, and which is still represented by Westminster Hall. There is scarcely a feature of Parliament which can be adequately described without long historical explanations. The present form of Parliament, as divided into two Houses of legislature, dates from the middle of the 14th century.

Parliament consists of the King, the House of Lords, and the House of Commons, or, as described in the enacting formula of acts of Parliament, the King's most excellent Majesty, the Lords Spiritual and Temporal, and the Commons. These are not as is often, but erroneously, supposed, the three estates of the realm. The clergy, who once counted as a separate estate from the Lords and Commons, have long ceased to do so. The two archbishops (Canterbury and York) and 24 bishops sit, as Lords Spiritual, in the House of Lords. The inferior clergy are for purposes of representation, merged in the laity, and represented in the Commons. An image of the full Parliament, as it existed in Plantagenet times, may still be seen when the king in person formally opens Parliament at the beginning of a session. The king sits on his throne, attended by his great officers of state. The benches of the House of Lords are occupied by the Lords Spiritual and Temporal, and by the peeresses. The judges, summoned as attendants, sit on their woolsacks in the middle. The Commons, as beseems their humbler station, find such room as they can, in or about the bar, with their speaker at their head.

The king, acting on the advice of his ministers, summons, prorogues and dissolves Parliament. He communicates with the two Houses by speech from the throne, commission, message and otherwise. He gives his assent to bills by commission. But he does not take part in, or attend, the deliberations of either House. Since Charles I attempted to arrest the five members no king or queen has been seen inside the House of Commons. Charles II sought amusement in listening to debates of the House of Lords, but his example has not been followed.

The House of Lords consisted in March 1918 of 692 members, including three princes of the Blood Royal — the Prince of Wales, the Duke of Connaught and the Duke of Albany; 2 archbishops, 21 dukes, 29 marquesses, 128 earls, 57 viscounts, 24 bishops, 384 barons, 16 Scottish and 28 Irish representative peers. There are, besides, 19 peeresses of the United Kingdom and 4 Scottish peeresses in their own right and 19 Scottish and 57 Irish peers who are not members of the House of Lords. Representatives of the Scottish and Irish peerage are elected by their peers, Scottish peers for each Parliament, Irish peers for life. But many of the peers of Scotland and Ireland are also peers of the United Kingdom and sit as such. Of the barons a few hold life peerages, as being, or having been, Lords of appeal; the other Lords Temporal hold hereditary peerages.

The House of Commons consists of 670 members, 461 for England, 34 for Wales, 72 for Scotland and 103 for Ireland. Single-member constituencies are the general rule, but in a few cases one constituency returns two members. Every male householder who has resided in his constituency for a year, and has paid or compounded for his rates, is entitled to be registered, and, when registered, to vote as a parliamentary elector for that constituency. This is the most general franchise, but there are others, including the occupation of lodgings rented at £10 a year, and the ownership or occupation of land or buildings of a certain value. Eight universities return nine members elected by their graduates. [Under the provisions of the Representation of the People Act (6 Feb. 1918), to take effect at the first subsequent general election, 31 new boroughs are to be created and 44 old ones extinguished. The number of members will be increased by 37, making a total of 707, provided there is no withdrawal or diminution of the Irish representatives in the interval. The basis of representation is at the rate of one member for every 70,000 of the population in Great Britain and one for every 43,000 in Ireland. The residential qualification for voters is reduced to six months. The register will receive 8,000,000 new voters, of whom 6,000,000 are women, voting for the first time in parliamentary elections. It is estimated that the new register will contain 16,000,000 voters, or one in every three of the population.] Subject to disqualifications arising from peerage, holding of office, bankruptcy, and conviction of treason or felony, every British subject who is of full age is eligible as a member of the House of Commons. A peer of the United Kingdom or of Scotland is not eligible, but a peer of Ireland is eligible for any but an Irish seat. For instance Lord Palmerston was an Irish peer. Where a member of the House of Commons is described as a lord, he is either an Irish peer, or, more frequently, a commoner holding a courtesy title as son of a peer. In the latter case the baptismal name is used, e.g., Lord Hugh Cecil — a son of the Marquess of Salisbury. Members of the permanent civil service, and most judges, are ineligible. All clergymen of the Church of England, ministers of the Church of Scotland, and Roman Catholic clergymen are disqualified.

The evidence of election is the return sent to the Crown office by the returning officer at the election. If the validity of an election is disputed, the question is tried and decided by election judges appointed by, and from among members of the High Court. A member must, before sitting or voting as such, except in the election of speaker, take the oath of allegiance, or make an affirmation to the same effect.

The chief alterations in the electoral law which took place in the 19th century were the Reform Act of 1832 which abolished pocket boroughs and enfranchised the middle classes; the Reform Act of 1867 which, by establishing household suffrage and introducing the lodger franchise in boroughs enfranchised the urban workingman; the Ballot Act, 1872, which introduced secret voting; the Reform Act of 1884, which enfranchised the rural laborer by extending household franchise to the counties; and the Redistribution of Seats Act, 1885, which made single member constituencies the general rule, and raised the number of seats to 670. As stated above, 37 seats are added by the Act of 1918.

The two Houses hold their sittings in the Palace of Westminster, which is appropriated to their use and to the use of the offices connected with them. The chambers in which they sit are so placed that, if the intervening doors are open, the King's throne at the south end of the House of Lords is visible from the speaker's chair at the north end of the House of Commons. The House of Commons does not occupy the site of the old Saint Stephen's chapel, which was burnt down in 1834, but is constructed on the same general plan, and does not provide sitting accommodation, in the body of the House, for more than about 300 out of the 670 members. For discomfort of crowding there is some compensation in case of hearing.

The accident that the House of Commons sits in a narrow room, with benches facing each other, and not, like most Continental legislatures, in a semi-circular space, with seats arranged like those of a theatre, makes for the two party system, and against groups shading into each other.

The duration of a Parliament was limited by the Septennial Act of George the First's reign to seven years, but its existence was always terminated by dissolution before the expiration of that period. The Parliament Act of 1911 reduced the maximum duration to five years. This measure was introduced bv the Liberal government in April 1910. The royal proclamation which dissolves one Parliament always summons another.

There are, or may be, several sessions of the same Parliament. A session is terminated by prorogation, which is an act of the Crown, done on the advice of Ministers. The business of each session begins with a King's speech, which announces its program, and ends with another King's speech, which reviews its proceedings. Each House has the power of adjourning its sitting from time to time. Thus it adjourns from day to day, and always adjourns for a short recess at Easter and ,Whitsuntide. The two Houses usually meet in February and sit till some time in August, but sometimes hold a late autumn sitting after an autumn recess. The time of meeting is practically fixed by the financial year, which ends on 31 March. Estimates for the ensuing financial year cannot well be got ready before February, and there is certain financial business which must be got through before the end of March.

Each House has its own staff. The Lord Chancellor is Speaker of the House of Lords, and is assisted by a salaried Lord Chairman of Committees. The House has a permanent clerical staff with the Clerk of the Parliament at its head. The Gentleman-Usher of the Black Rod, who has a Yeoman-Usher to assist him, summons the Commons when their attendance is required in the House of Lords, and performs certain other functions mostly ceremonial.

The Speaker of the House of Commons is elected by the House from among its own members for each Parliament. He is the representative and spokesman of the House in its collective capacity (whence his name); he presides at meetings of the House; and be declares and interprets its law. Though necessarily a party man representing a constituency, he is independent of party, and his tenure of office is not affected by a change of ministry. His powers are more extensive than those of the Speaker of the House of Lords. He has an official residence, besides his salary ($25,000). He is assisted by a chairman and deputy-chairman of Ways and Means, who take the chair at meetings of a committee of the whole House (there are temporary chairmen also) and who can take the speaker's place as deputy speaker during his temporary absence. These are the only members of the House who receive salaries as officials of the House.

The clerk of the House of Commons is the head of its clerical staff. The sergeant-at-arms sees to the maintenance of order within the precincts and to the execution of the orders of the House, and, as housekeeper, looks after its domestic staff and arrangements.

The law of Parliament consists of the rights, usages, practice and regulations of each House. It may be classified, from a Benthamic point of view, as a substantive law of rights and privileges, and an adjective law of procedure; or, again, as an unwritten customary law to be gathered from precedents and decisions, and an enacted law to be found in orders of the Houses. The substantive law would include the rules which govern the rights of each House, or of the individual members of each House, in their relations to each other, to the Crown, to the executive and judicial authorities of the country, and to individuals and bodies outside Parliament.

The privileges which are formally claimed by the House of Commons through its speaker at the beginning of each Parliament, bulked large in the 17th century controversies between the King and Parliament, and were much insisted on by the Commons of the 18th century, but in the 20th century have retired into the background. The cases in which a member of Parliament, as such, can claim any exceptional privilege or immunity are now few and rare.

The House of Lords is not only a branch of the legislature but the ultimate Court of Appeal from the ordinary courts of the United Kingdom. (Appeals from the colonies and dependencies and ecclesiastical and certain other appeals lie to the Judicial Committee of the Privy Council). It performs its judicial functions exclusively through those of its members who hold or have held high judicial offices. It holds its judicial sittings in the morning, and can sit judicially when the legislature is not sitting. For legislative and general business, its sittings begin at 4.15 in the afternoon and, as a rule, are not of long duration. The cases in which they extend over the dinner hour are exceptional. It does not sit on Wednesday or Saturday.

The House of Commons, when in session, sits from 2.45 to 11 on Monday, Tuesday, Wednesday and Thursday, and from 12 to 5 on Friday. It begins with uncontentious private bills and other formal business. Questions to Ministers (which are not put on Fridays), occupy or may occupy the time till 3.45. As soon as questions have been disposed of, the public business of the day begins. Opposed business is not taken after 11, unless it belongs to a special "exempted" class, or unless the eleven o'clock rule is suspended.

The business of the House of Commons is three-fold, legislative, financial, critical. It makes laws with the concurrence of the House of Lords and of the Crown. It imposes taxes and appropriates revenue. By means of questions and discussions, it criticizes and controls the action of the executive.

While a project of law is before either of the two Houses it is called a bill. When it has received the royal assent it is called an act. A bill may be introduced into either House by a member of that House. When it has been introduced, it is read a first time and is printed by order of the House. The stage of first reading is formal. On the second reading questions of principle are discussed. If the second reading is affirmed, the bill goes to a committee, which, in the House of Commons, is either a committee of the whole House, or one of the standing committees on bills, or a select committee. In the absence of special order it goes, under the existing orders, to a committee of the whole House.

A committee of the whole House is really the House itself sitting in a less formal manner, presided over by a chairman at the table, the speaker's chair being vacant, and freed from some of the restrictions which attach to proceedings when the speaker is in the chair.

The standing committees on bills, of which there are at present two, are constituted by the committee of selection, and are intended to be microcosms of the whole House. Each of them consists of not less than 60 members, and the quorum of each is 20.

A select committee is appointed by the House, and its members are nominated by the House itself, or, in some cases, either wholly or partially by the committee of selection. The nomination of members by the House is made in pursuance of arrangements between the "whips" of the several parties. There may be joint select committees of the two Houses. When a bill has gone to a select committee, it must subsequently pass through a committee of the whole House, but this is not a case with a bill sent to a standing committee.

At the committee stage a bill is gone through clause by clause, and amendments are proposed, discussed, and, if agreed to, made in the bill. When the consideration of a bill in committee is concluded, it is reported to the House, with or without amendments, as the case may be. On consideration of the report, there is an opportunity for making further amendments.

The next stage is the third reading. In the House of Commons this is the final stage, and only verbal amendments can be proposed. In the House of Lords substantial amendments can be moved at this stage, and also on the subsequent question, not put in the House of Commons "that this bill do pass."

When a bill has been passed by either House it is sent by message to the other House to pass through its several stages there. If the second House amends a bill thus sent to it, it requests the concurrence of the originating House in the amendments. Should the two Houses differ, amendments and counter amendments pass to and fro until an agreement is arrived at. Until the Parliament Act of 1911, if no agreement could be arranged, the bill dropped. If a public bill was not either passed or withdrawn in the course of a session, it lapsed at the end of that session.

The Parliament Act, however, introduced some profound modifications in constitutional procedure and parliamentary practice. These changes are explained in the next article.

The final stage of a bill is the royal assent, which is given, by commission, in the House of Lords, in the presence of representatives of both Houses. As the king can only act on the advice of his Ministers, who presumably command a majority in one of the two Houses, the royal assent to a bill is now given as a matter of course. The last instance of refusal was in the reign of Queen Anne.

A distinction is drawn between public bills, the object of which is to alter the general law, and private bills, the object of which is to alter the law relating to some particular locality, or to confer rights on or relieve from liability some particular person or body of persons. The procedure on private bills differs materially from that on public bills, and is governed by a different set of standing orders.

Every private bill goes, after second reading, to a small committee, before whom, if the bill is opposed, witnesses are called and counsel heard. The proceedings before these committees are quasi-judicial in their nature. Many things which used to be done by private bills, are now done by provisional orders, which are made by a public department, after local enquiry, and when made, are confirmed by provisional order confirmation bills, to which they are scheduled. Sometimes, to prevent hardships, the proceedings on a private bill are continued, by special order, to another session.

The right of granting money in Parliament belongs exclusively to the House of Commons. The House of Lords assents to, and could reject, a grant of money, but cannot initiate or alter a grant. The Parliament Act (q.v.) deprived the Lords of all powers to interfere with money bills.

The right of the House of Commons to grant or raise money is subject to two important restrictions. It cannot vote money except in pursuance of a request from the Crown. It cannot impose or increase a tax unless the tax or its increase is declared by the constitutional advisers of the Crown to be necessary for the public service.

The demand by the Crown for the grant of money for the service of each financial year is made in the speech from the throne at the beginning of each session. As soon as practicable afterward estimates are presented to the House showing the amount which will be required for the public service. Supplementary financial estimates for the current financial year are also, if necessary, presented. The ordinary annual estimates are presented in three parts or divisions, each comprising one of the three branches of the public service, namely, the navy, the army and the civil service. Each estimate contains first, an estimate of the total grant thereby demanded, and, then, a statement of the detailed expenditure under each grant, divided into subheads or items. For the purpose of considering these estimates, and voting the money required, the House resolves itself, at the beginning of each session, into a committee of the whole

House, which is called the committee of supply. Not less than 20 days must be allotted in each session for the sittings of this committee. Votes which have not been previously considered and disposed of by the committee are passed *en bloc* at the end of the session. When the resolutions for the votes have been passed by the committee they are reported to and confirmed (technically «agreed to») by resolution of the House. Resolutions authorizing the grant, out of the consolidated fund of the money required to make good the supply voted in committee of supply, are passed by another committee of the whole House, called the committee of ways and means, and are also confirmed by resolutions of the House. And these resolutions are finally confirmed by one or more Acts of Parliament called Consolidated Fund Acts, and by the annual Appropriation Act which is passed when the supply for the year has been disposed of. Before the end of each financial year a vote on account is always necessary to supply the current expenses of the civil service during the next financial year, and, for a similar reason, a sufficient amount of money must also be voted for the navy and army, in whose case there is greater facility for transferring money provisionally from one vote to another. A Consolidated Fund Act confirming these votes must also be passed before the end of the financial year, i.e., before March 31. It follows from the principles laid down above, that the committee of supply and the House can reduce, but cannot increase, a grant asked for by the estimates. Nor can they alter its destination.

Once a year the Chancellor of the Exchequer, in committee of ways and means, makes his annual budget statement, reviewing the revenue and expenditure of the past financial year, estimating the revenue and expenditure for the next financial year, and proposing such increases or remissions of taxation as are in his opinion required for, or justified by, the position. These proposals are embodied in resolutions which, when passed by the committee of ways and means, and agreed to by the House, are confirmed by an Act of Parliament, called the Finance Act of the year. Here again the House and its committee can dissent from, or reduce, a proposed tax, but cannot impose or increase a tax.

Under the Cabinet system the executive government is dependent on the support of Parliament, and, in particular, of the House of Commons. The king appoints a Prime Minister who can command a majority in that House. The Prime Minister selects the members of his Cabinet, and the holders of minor political offices, from among those of his followers who have, or are likely to have, seats in one of the two Houses. The Ministry as a whole, and each Minister separately, is responsible to Parliament, and particularly to the House that supplies the money without which government cannot be carried on. If a Ministry cannot retain the confidence of that House the Prime Minister must either resign or appeal to the country by a dissolution of Parliament.

The control of the House of Commons over the executive government can be exercised, not only by withholding assent to the legislative and financial proposals of the government, but in various other ways. Thus it can obtain information as to the proceedings of the government by means of questions and of orders for the production of documents.

Any member has the right to address a question to any Minister of the Crown, being also a member of the House, about the public affairs with which he is officially connected, or a matter of administration for which he is responsible. The proper object of such a question is to obtain information on a matter of fact within the special cognizance of the Minister, and the rules and practice of the House limit the right to ask questions so as to confine them to this object. Except in special cases, notice of any such question must appear on the notice paper at least one day before the answer is to be given. If a member wishes his question to be answered orally, he marks it with an asterisk, and a time is set apart at the beginning of each afternoon sitting for the answering of such questions. Debate is not allowed during this period, but an unsatisfactory answer may, if the matter is of sufficient urgency and importance, give rise to a motion for adjournment, so as to provide opportunity for discussion at a later period of the day.

The House can, on the motion of any member, obtain returns supplying such information on matters of public importance as is obtainable through departments of the government. A motion for a return may be opposed on grounds of public policy, such as that the disclosure of the information sought is not for the public interest, or that its supply would involve unreasonable labor and expense, but much information thus sought is periodically supplied in the form of «unopposed returns.» The government can also, and frequently does, on its own initiative, lay papers before the House. Such papers are known as «Command Papers.» These returns and papers, together with the returns presented in pursuance of directions contained in Acts of Parliament, and the Reports of Parliamentary Committees and of Royal Commissions, make up the formidable mass of official literature popularly known as «Blue Books.»

But the principal opportunity for criticising the administrative action of the government is afforded by the discussions in committee of supply, for which, as has been stated above, a minimum number of days must be set aside in each session. On the old principle that redress of grievances should precede the grant of supply, the action of each Minister and of the departments and officers over whom he has control, can be discussed on the vote for the branch of expenditure concerned. As has been seen, the House can reduce but cannot increase expenditure proposed by the Crown, and therefore any complaint made in committee of supply must be based on a motion for reduction of a vote, even, paradoxical as it may seem, though it be a complaint of insufficient expenditure. Other opportunities for criticising the action of the government and raising questions of public policy are supplied by the debate, at the beginning of each session, on the address in reply to the speech from the throne, by debate on motions which must be made when the House first goes into committee of supply on the navy, army and civil service estimates respectively, by the evening sittings appropriated to the discussion of private members' motions, by the second and third reading stages of the Consolidated

Fund Bills and the Appropriation Bill, and by the motions which have to be made for the adjournment of the House over a recess.

A full account of parliamentary procedure would be impossible here. Some points have been touched on above, a few others may be briefly noted.

Each House has power to make its own orders, supplementing or modifying its customary rules of practice. A standing order continues in force until repealed. Other orders may be made for a particular session, for a more limited period, or for a particular occasion.

In the House of Commons any question of the law or practice of the House is decided, as a point of order, by the speaker, or, in committee, by the chairman.

In the House of Commons, government business has precedence at most sittings, and Thursdays are usually devoted to committee of supply. Private members' bills have precedence on Fridays, and private members' motions have precedence, during part of the session, between 8.15 and 11 on the evenings of Tuesday and Wednesday.

The quorum of the House of Commons, and of a committee of the whole House, is 40, including the speaker or chairman. (In the House of Lords the quorum is 3).

A matter requiring the decision of the House or of a committee is decided by means of a question put from the chair on a motion proposed by a member.

If the opinion of the speaker or chairman as to the decision of a question is challenged, he allows two minutes to elapse, in order to enable members to assemble, and then puts the question again. If his opinion is again challenged he directs the 'ayes' to go to the right and the 'noes' to the left, and appoints two tellers for each. The 'ayes' and 'noes' then pass through their respective division lobbies, on each side of the House, their names are taken down by the division clerks, and they are counted by the tellers, who announce the result at the table of the House.

If a debate on a question is unduly protracted, it can be terminated by means of what is called the closure, the procedure on which is as follows: A member rising in his place may claim to move "That the question be now put," and, unless it appears to the chair that the motion is an abuse of the rules of the House, or an infringement of the rights of the House, this preliminary question must be put forthwith, and, if it is carried, the main question is put forthwith and decided without amendment or debate. But a motion for the closure cannot be carried unless it appears on a division that not less than 100 members voted in the majority in its support. The result is to leave to the chair discretion as to the time and circumstances in which closure should, with propriety, be granted.

The speaker and chairman are also clothed with powers for checking irrelevance, prolixity, repetition and obstruction, for preventing the abuse of dilatory motions, and for maintaining order and decorum. If a member is guilty of grossly disorderly conduct, the speaker or the chairman of a committee of the whole House can order him to withdraw from the House. If a member disregards the authority of the chair, or abuses the rules of the House by persistently and wilfully obstructing its business, he can be "named" for the offence by the speaker or by the chairman of a committee of the whole House, and the House can, on motion made, make an order suspending him from the service of the House for the rest of the session. Orders of this kind, when made by the House, or by the speaker or chairman, are enforced if necessary by the sergeant-at-arms with such assistance as may be required. In the case of grave disorder arising in the House, the speaker may, if he thinks it necessary, adjourn the House without question put, or suspend the sitting.

The Parliament at Westminster is not only the oldest, but the mother of all existing Parliaments. Those who framed the constitution of the United States took the British constitution as their model, but studied it through the spectacles of Montesquieu, and thus brought about that separation between the executive and the legislative powers which makes such an essential difference between the British House of Commons and the American Congress. English parliamentary procedure has made the tour of the world. The rules adopted by the French assembly after the Restoration were based on a sketch of English parliamentary procedure supplied to Mirabeau by Dumont. The influence of English practice, derived either directly or through the medium of France, can be traced in the procedure of all Continental legislatures. Thomas Jefferson, when President of the United States, drew up for the use of Congress a manual consisting largely of extracts from English parliamentary precedents, and Jefferson's Manual is still an authoritative work. Every legislature of a British colony conforms to the rules, forms, usages and practices of the British House of Commons, except so far as they have been locally modified. Of all parliamentary institutions throughout the world the Parliament at Westminster remains the archetype.

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COURTENAY ILBERT,
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12. PARLIAMENT ACT, 1911. This important measure was introduced by the Asquith administration in April 1910, with a threefold object: (1) to reform the House of Lords by substituting a popular or representative basis for the hereditary one then (and still) existing; (2) to restrict the vetoing powers of the Lords in regard to money and other bills; and (3) to reduce the life of a Parliament from seven to five years. Though the entire measure became law, no step had been taken up to 1918 to alter the constitution of the Upper Chamber; the two other provisions are in force. The measure was forced through the House of Commons on 15 May 1911, after a series of stormy debates lasting 23 days, thus bringing to a close the historic struggle which had raged between the two Houses of Parliament for 18 months. See POLITICAL PARTIES.

The act provided (1) that if a money bill, having been passed by the Commons, and sent up to the Lords at least one month before the end of the session, is not passed by the House of Lords without amendment within one month after being so sent up, the bill shall become law, notwithstanding that the Lords have withheld their consent. It was left to the speaker to decide what is or is not a money bill, and his certificate to that effect must accompany the bill on its journey to the Lords; (2) if any bill other than a money bill is passed by the House of Commons in three successive sessions (whether of the same Parliament or not), and is rejected by the Lords in each of those sessions, it shall become an act of Parliament on its third rejection. This provision, however, does not take effect unless two years have elapsed between the date of the first introduction of the bill and the third passing in the House of Commons. If the House of Lords does not pass any such bill without amendment, it shall be deemed to be rejected unless the amendment meets with the approval of both Houses. It will be seen at a glance that the Parliament act not merely "restricted" the veto of the House of Lords, but removed it altogether, leaving in its place only the power to "hang up" a measure, in other words, to delay a legislative proposal without being able to make any alterations or amendments unless the other House agrees to accept them. The House of Lords being at all times overwhelmingly conservative, it had long been a legitimate grievance of Liberal administrations that their legislative measures suffered far more severely than did those of the Conservative or Unionist party, when in power, at the "revising" hands of the Lords. After weeks or months of fierce Parliamentary fighting, the Liberals had frequently carried some highly contentious bill through a third reading in the Commons only to see it "thrown out" or extinguished by the Lords in a few minutes. The Parliament act removed that obstacle with one bold stroke.

A committee was appointed to inquire and report on the nature and limitations of the legislative powers to be exercised by the reformed Second Chamber, and the best mode of adjusting differences between the two Houses.

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Editorial Staff of The Americana.

13. CROWN AND CABINET. The crown is a chattel, and is kept in the Tower of London. But the genius of the British race, striving unconsciously toward the expression of national unity and permanence, has come to personify it as a power, which, though necessarily wielded by or in the name of an individual ruler, exists independently of the lives of kings and queens. The materials of which the crown is composed will outlast the lives of many rulers. Whilst they are mortal, is it not, in the strictest sense, immortal?

The late Dr. Hearn pointed out, in his admirable work entitled 'The Government of England,' that, in spite of the progress toward democracy of the 19th century, the British Constitution remained, in a very real sense, a monarchy. Not only is it still true that, as regards all foreign communities, the empire is represented by the monarch alone, and that it would be a gross breach of political etiquette for any person or body to attempt to open up any other channel of official communication with a foreign community, but it is equally true, that every internal act of State — legislative, executive, or judicial — both in the United Kingdom and in the dominions beyond the narrow seas, is done in the name of the monarch, and that no such act can be *ultra vires.* It is of the essence of the British conception of State sovereignty that the monarch is incapable of committing legal wrong.

This apparently Oriental dogma is, however, balanced by the equally fundamental doctrine, that for every political act of the monarch there is an appropriate agent, and that such agent acts at his peril. In some cases, the peril is remote and uncertain; in others it is prompt and definite. The Parliament which advises bad legislation is amenable only to the judgment of the electors expressed at the polls. The judge who abuses his office, though he may be dismissed by the monarch for actual illegality, is amenable, so far as the citizen is concerned, only to the vote of Parliament. But the executive official who breaks the law is liable to an action in the ordinary courts by the humblest citizen whom he has injured; and his plea of "superior orders," though it may involve the superior also in liability, will not absolve the actual delinquent. And thus, inasmuch as, in the enormous complexity of State action, it is hardly possible for the personal act of the monarch to reach the individual except through the hands of some intermediary, the subject is rarely without redress. Even the House of Lords, the greatest anomaly in the constitution, can be made to feel the pressure of public opinion.

The Independence of Ministers.— The natural consequence of this fundamental principle of the responsibility of the Crown agent is the independence of the agent toward the Crown. Historically speaking, the claim of independence was first put forward by the judiciary, whose members, though for centuries both in law and in fact the servants of the monarch, liable to dismissal at pleasure, succeeded, before the end of the Middle Ages, in banishing the King from his own law courts, and in acting as an independent department of state. Down to the end of the 17th century, their success varied with the political balance of power; but it was assured, soon after the Revolution, by the Act of Settlement, which, in fact, made the judges independent of the Crown, though still, technically, liable to dismissal for actual misconduct.

Meanwhile, Parliament, a later institution than the courts of law, had, by a series of struggles which have made it famous in the world's history, succeeded, not merely in emancipating itself from the control of the monarch, but in establishing itself as an essential part of the national government. The history of these struggles is told elsewhere.

Here it is sufficient to remember that, on his restoration to the throne, Charles II realized that Parliament could be cajoled, but could no longer be bullied. Even the enthusiastic loyalty of the Restoration Parliaments would not tolerate violence, though it fell a somewhat easy prey to the more sinister influence of corruption.

The executive was much longer in securing its independence. Down to the Revolution, the holders of executive offices were, in fact as well as name, «His Majesty's servants.» Outside legislation and judicature, the personal will of the King directed the policy of the country, subject only to the indirect check of a refusal by the House of Commons to grant supplies. But, with the accession of a foreign ruler, in the person of William III, and a renewal of the foreign element with the accession of the House of Brunswick, affairs rapidly changed. William was absorbed in great foreign schemes, and left home affairs to his Ministers. Anne was lethargic, and indifferent to matters which did not concern her personal comfort or the interests of the Church. George I knew no English, and soon ceased to attend meetings of the Council, except purely formal meetings where his presence was absolutely essential. Thus the real control of affairs passed into the hands of the great officials of state.

At this point there was a real danger (not sufficiently appreciated by English historians) that the government of England would become a bureaucracy, each department in effect the private preserve of its chief, pursuing its way regardless of, or even in opposition to, the other departments, and intriguing for power and privilege. From this danger the country was saved by the peculiarities of the political situation, and by the financial power, based on long established tradition, of the House of Commons.

Ministers and the House of Commons.— During the first half of the 18th century, the dominating feature of the political situation was the possibility of a Jacobite restoration. So long as the throne was occupied by a daughter of James II, or even by the husband of one of those daughters, the country accepted the Revolution settlement with acquiescence, if not with enthusiasm. But, when it became clear that Anne would leave no heir, the hopes of the Jacobites revived. It was with difficulty that the Queen herself had been brought to accept the scheme of the Act of Settlement of 1701, by which the succession to the throne, on the failure of her issue, had been settled on the Princess Sophia of Hanover, the granddaughter in the female line of James I. The politically useful legend, that the «Old Pretender» (the son born to James II on the eve of his flight) was a supposititious child, had long been exploded; the child himself, now a young man of winning personality, was prepared, at Anne's death to vindicate the claim which had passed to him on the death of his father; and the Queen was believed to sympathize fully with his ambitions. The House of Hanover was regarded as a mere stalking-horse for the ambitions of the Whig statesmen; and the first two of its princes to occupy the throne of Great Britain and Ireland were looked upon by the mass of the people as foreigners. In 1715, and again in 1745, the fate of the throne trembled in the balance.

Thus the Ministers of George I and George II carried their lives, or at least their fortunes, in their hands. A Jacobite restoration meant, at the very least, banishment and confiscation for them, if not something worse. They could not afford to run unnecessary risks.

There can be little doubt that the Whig leaders would have been glad, in spite of their constitutional principles, to dispense with the presence of Parliament during these troubled years. Apart from the possibility — the probability — that it might result in an accession of strength to the Jacobites in the House of Commons, there was always the fear that the license of a general election would be made the cover of a Jacobite *coup de main*. This fear is shown by the striking step taken soon after the accession of George I; when the Parliament, at the urgent instigation of Ministers, prolonged the term of existence, not merely of its successors, but of itself, from three to seven years, by the Septennial Act of 1715.

Fortunately, however, it was not possible for the Whig leaders to dispense with the assistance of Parliament; and this for the good old reason which had for so long been the sheet-anchor of Parliament in its struggle for power. In spite of the large hereditary revenue settled upon the Crown at the Restoration, and the rich inheritance of the Crown lands, George I and George II, like their predecessors, continually needed money; and the only stable source of money was a vote of the House of Commons. The chief secret of Walpole's favor at court, as well as of his ascendancy over his colleagues, was the power which he possessed of securing this vote. For the first time in the history of England, the power of the executive depended, openly though not officially, on the fluctuating moods of the representative House.

Gradually, then, by the teaching of events, the Ministers of George I and George II began to realize the conditions upon which Cabinet government depends for its success. It was necessary, if they were to prevent the commission of blunders which might bring down the dynasty and its supporters in one common ruin, that they should, in fact, control the action of the king. To secure this control, naturally very distasteful to monarchs brought up in the absolutist traditions of mediæval Germany, it was necessary that they should (under forms of deferential politeness) be able both to coerce and to bribe the occupant of the throne. So long as they acted as individuals, the former object was unattainable; for both George I and George II were quite shrewd enough to be able to play off one rival against another. But a threat of resignation by all his Ministers at once was more than a foreign ruler, ignorant of the temper of his subjects and of the machinery of government, could safely disregard. Equally was it desirable, if not essential, that Ministers, if they desired to bribe the king, should act together. For the means of bribery were only to be obtained from the House of Commons; and that House, though it doubtless regarded this new harmony of Ministers with deep suspicion, found it more difficult to refuse supplies demanded by the unanimous voice of the government, than when it could plead as an answer to the demands of one Minister, that his colleagues differed from him as to the wisdom of his plans. Thus gradually, from no very honorable motives, but as a mere counsel of expediency, Ministers acquired the habit of talking over their plans together; and the rival, and often openly quarrelling Ministers of William III and Anne, were replaced by the Cabinets of George I and his son. No doubt the unanimity, such as it was, was mainly superficial; but, for all that, in a matter wherein appearances counted for much, it was important.

The Modern Cabinet.— So much it seemed necessary to say to account for the appearance in English politics of a phenomenon so remarkable as the Cabinet, and so difficult to refer, for an explanation of its origin, to any particular crisis or any official document. Indeed one of the most striking features of the Cabinet system is its wholly informal character — a feature which adds both to its utility and to its interest as an object of study. It is natural, no doubt, that no one but those who have taken part in its proceedings should be able to speak authoritatively of the details of the working of a great political organ. But it is none the less curious that, until the appearance of the masterly essay of Bagehot, entitled 'The English Constitution,' in 1867, even the general outlines of the system by which they had in fact been governed for upward of a century should have been unfamiliar to a people so keenly interested in politics as the British. And yet that such was the case is shown by the almost ludicrous difficulties experienced by the self-governing colonies of Australia, when, in the 50's, they endeavored to introduce it into their new constitutions.

But here we must leave the historical method, passing by the vigorous but unsuccessful attempt of George III to overturn a system which he thoroughly disliked, the brilliant new development introduced by Pitt in his gallant struggle against the coalition of Fox and North in 1784, the remonstrance made by Queen Victoria against the application of its principles to the famous «Bed-chamber» question in 1839, and the more successful vindication of her rights by the same monarch against Lord Palmerston in 1850. Let us make some attempt to enumerate the essential features of the system as it exists to-day.

Its Executive Character.— The first point to notice is, that the Cabinet is not a mere council of political experts, but a body of working administrators. With one or two exceptions, each of its members is actually responsible to Crown and Parliament for the conduct of some department of State. It is true that he is, almost invariably, chosen rather for his general political importance than for his skill in the affairs of his department, i.e., an office is found for him because his presence in the Cabinet is desirable. But, none the less, the official character of its members gives the Cabinet a power which no mere advisory council could ever exert. Not only is the Cabinet aware of the awkward secrets of public business, and the practical difficulties of carrying out any line of policy, it is its own executor; for, except in the improbable case of disloyalty to his colleagues, the Minister to whose department the carrying out of that policy belongs, at once insists upon its adoption by his subordinates, the officials of his department.

Its Parliamentary Influence.— In the second place, and still more important, the Cabinet wields vast Parliamentary influence. In effect, its members are invariably members of Parliament, though, legally speaking, no one of them need be; and most of them are men of commanding personal weight in the House of Commons. We have seen how the necessity of conciliating Parliament was forced upon the Ministers of George I and George II. It is now fairly well understood that the influence exercised by those Ministers was obtained by means not the most creditable. But the death-blow to Parliamentary corruption, already checked by the Place Act of 1742, was dealt when Pitt appealed from the House of Commons to the country in 1784; and the *coup de grâce* was given by the Reform Act of 1832. Since that date the place of the old sinister influence of the «spoils» has been taken by the organization of the party system (see POLITICAL PARTIES); and the substitution of examination for patronage, in the vast mass of appointments to the permanent civil service (q.v.) has rendered the working of the party system comparatively pure. For the most part, Ministers control Parliament by the support of followers who honestly believe their policy to be good, or, at least, the best available; and such corruption as exists is confined to the polling booths.

The Escape of 1705.— One of the most curious facts in the whole history of the Cabinet is that this control of Parliament by Ministers was very nearly becoming, so far at least as the House of Commons was concerned, a legal impossibility. The Act of Settlement of 1701 (so often alluded to) contained a clause expressly excluding from the representative House all holders of office under the Crown. This part of the act, however, was not intended to take effect until the accession of the House of Hanover; and, before that date, it had been repealed by another act of the year 1705. But neither the statesmen of 1701 nor those of 1705 appear to have had any idea of the importance of the question.

Dependence of the Cabinet on the House of Commons.— But it is of the first importance to remember that the influence of the Cabinet on Parliament is at least counter-balanced by the influence of Parliament on the Cabinet. Apart from the general attitude of the House of Commons toward Ministers, which is, of course, vital, the opportunities which occur in both Houses for criticizing every action of the Executive are of daily occurrence during the session of Parliament. In fact, one of the chief cares of the Prime Minister in forming his Cabinet is to provide acceptable champions of its acts in either House. It is a constitutional maxim, that every department must be represented in both Houses, so that there may always be present some responsible Minister to explain and give information upon any point of administration which any member of either House may choose to raise. This explanation and information are rendered chiefly in the form of answers to questions of which due notice has been given; and a glance at the Question-Paper for any day will reveal the vast and detailed mass of information which Ministers must be prepared to supply to Parliament. A Minister can, of course, plead "reasons of State" for withholding information. But such a plea is apt to provoke suspicion; and if, for that or any other reason, the reply of a Minister is not considered satisfactory, further steps can be taken (such as a motion for adjournment, a proposal to reduce the estimates, or even a vote of want of confidence), in order to impress upon a Cabinet the error of its ways. The discussion on the budget is the grand opportunity for criticism of the executive by Parliament; and, though the power is sometimes abused, it cannot be denied that the constant liability of Ministers to justify their conduct in Parliament is one of the most valuable principles of the Cabinet system.

But the essential character of that feature of the Cabinet system which we are now discussing, is best proved by the unquestioned rule of constitutional custom: that a Cabinet defeated on an actual vote in the House of Commons must instantly either resign or persuade the king to dissolve Parliament. The former alternative, established by the resignation of Walpole in 1742, on the apparently irrelevant question of the Chippenham election, was long thought to be the inevitable sequel of defeat in the House of Commons. But Pitt, in 1784, added the second alternative, with striking success. Whether the king is bound to grant a dissolution upon the request of a Cabinet, is a delicate question which is said to turn on the point whether the Cabinet was in office when the previous general election occurred. If so, the country has pronounced its opinion; and the Cabinet is not entitled to a second verdict. Probably, however, the true doctrine is, that if there is any reasonable probability of the Cabinet securing a majority in the country, it is entitled to a dissolution. Needless to say, if the verdict of the polls is against it, the Ministry at once resigns, as Gladstone's government did in 1874, and Lord Beaconsfield's in 1880. It may be incidentally remarked, that the fall of the Cabinet results in the resignation of about 30 other high officials, e.g., the law officers, the under-secretaries of state and the chief household officials, who, though not members of the Cabinet, are more or less in its confidence and are, in contrast to the permanent officials of the civil service, "liable to retire from office on political grounds." These removable officials, together with the Cabinet, constitute the "Government" or "Ministry."

Informal Character of the Cabinet.— The third cardinal principle of the Cabinet system is its completely informal character. The Cabinet is indifferently described as a committee of Parliament and a committee of the Privy Council; but, in law it is neither. It is true that in each House of Parliament there is a Ministerial (not a Cabinet) bench; and that, in the House of Commons, the Cabinet wields a great and growing control over business. None the less, it is undoubted that its members sit by virtue of their membership of the House and not by virtue of their offices and that the measures which they propose, though commonly called "Government measures," are, with the exception of financial proposals, technically brought forward in their capacity of influential members of the House, and not as Crown officials. Even the King's Speech, though unquestionably drawn up by the Cabinet, is delivered in the House of Lords by the King himself or by special commissioners; while in the Commons it is read by the Speaker, who is not a government official.

On its executive side, the Cabinet is equally informal. Its members are always made members of the Privy Council, in order that the oath of secrecy may be administered to them. But, as a body, it has no legal existence. It is never constituted by order in council, the clerk of the council is not present at its meetings, no minute or record of its proceedings is made, no decrees or orders are issued in its name, and it is never alluded to in Acts of Parliament, though the phrase "Responsible Minister of the Crown" is once or twice to be found in the Statute-Book. The various departments, such as the Admiralty and Treasury boards, have, by tradition or statute, certain limited powers of issuing orders and regulations; but, in the vast majority of cases, the deliberations of the Cabinet appear in the guise of Orders in Council, i.e., commands of the King, issued by the advice of the Privy Council, or in the form of simple executive acts of the Crown, signified through the appropriate Minister. Both these classes of acts always receive the personal approval of the King, in whose name they are done, though the approval of the Privy Council is a pure formality.

The Unity of the Cabinet.— Fourthly, the unity of the Cabinet is expressed by the Prime Minister, though it is only within a short time (January 1906) that the existence of the working head of the Ministry has been formally recognized, and that only by a place in the official Table of Precedence. No Prime Minister's department exists, though the estimates have recently provided for two or three private secretaries. Like his colleagues, the Prime Minister is simply the holder of an executive post, though it is usual to appoint him to a well-paid sinecure (First Lord of the Treasury, $25,000) in order that he may have time to devote to the general policy of the government. But even this practice is very recent. Walpole, who really created the position of Prime Minister, always declined to assume the designation; and the fiction was long maintained by the unwise practice of charging the holder of the position with the actual cares of a working department, such as the Foreign Office or the Exchequer.

And, even now, the precise relations between the Prime Minister and the Cabinet as a whole depend more upon the nice balance of circumstances than upon any well-defined tradition. The fact that the Prime Minister has been charged with the formation of the ministry, a fact which in itself is usually (though not always) a consequence of his election as leader of his party whilst in opposition, necessarily gives him a strong position with regard to his colleagues, who are, in a sense, his nominees. This advantage is strengthened by the rule that the collective decisions of the Cabinet are always communicated to the King by his mouth, while his prominence in the public eye tends also in the same direction. But the desirability of including in a ministry the ablest and most popular members of the party, the desire of avoiding any appearance of schism in the ranks of the government, and the almost unfettered discretion conceded to individual Ministers in the administration of their own departments, upon the business of which they communicate directly with the King, all combine to prevent the leadership of the Prime Minister, in normal circumstances, solidifying into actual control. Whether this result is desirable or not, may be regarded as an open question. On the one hand, a weak Prime Minister is said to imply a weak Cabinet; on the other, a Prime Minister of overpowering strength is not without his drawbacks. It is often said, for example, that the Liberal Party was driven into its long exile in 1895, because, in the later days of his leadership, none of his colleagues was «able to stand up to Mr. G.»

The Position of the Crown.— In concluding this brief sketch of the working of the Cabinet system, it may be well to anticipate a criticism which every succinct account of the working of British politics is likely to raise in the mind of a reader not himself personally familiar with its atmosphere. A foreign observer may well be expected to say, though it would hardly ever occur to a Briton to say: «What then is the use of the King, if he is merely the mouthpiece of his Ministers; if, except on the rarest occasions, he is bound to accept the advice tendered to him by his constitutional advisors? Does it not really seem as though Carlyle's proposal for a 'cast-metal king' would fit the present British Constitution?»

The first answer to this criticism is the reminder that, though politics are an important side of public life in the British Empire, they do not by any means exhaust its interests. And the occupant of the throne is by no means confined to the sphere of politics. As the head of society, as the patron of religious, charitable, agricultural and scientific enterprises, as the encourager of art and sport, as the focus of that spectacular world which, even to the phlegmatic Briton, is no small share of his existence, the opportunities of the monarch are unlimited, and his personal discretion unfettered. To secure the presence of the King at any function, is to place success beyond the range of doubt. For the King to take a personal interest in the prosperity of a public enterprise, is the surest guarantee of its popularity. The King's Hospital Fund is but one of countless examples of this truth. And with all these matters the Cabinet has no concern.

But, even in the realm of politics, the King is very far from being the mere figure-head which superficial observers have sometimes supposed. It is true that the splendid service which the King renders to the State as the embodiment and symbol of the unity and permanence of a world-wide empire is, perhaps, the greatest of all the functions of the Crown; and, it may be added, there can hardly be any position more truly splendid, more worthy of the highest powers, more capable of being used as an instrument of good. Its singular value is that, while it affords scope for the powers of genius, the position is capable of being reasonably well filled by any man or woman of moderate ability and first-rate training, while even an unworthy holder cannot do very much harm in it. In other words, it is a position singularly well suited to an hereditary monarch.

And it would be a great mistake to assume that, even in the realm of politics, the function of the monarch is confined to the outward show of things, and has no place behind the scenes, where the real fates of nations are decided. Bagehot, in his work before referred to, has summarized, with his usual justice, the political rights to which a constitutional monarch, in a system like the British, is entitled. He has «the right to be consulted, the right to encourage, the right to warn.» And, as the same writer very truly remarks, such rights, in the hands of a monarch of sense and sagacity, and it may be added, of experience, are singularly effective. In modern conditions, the air of a court is by no means so fatal to width of outlook and knowledge of the world as in the days before the popular press and facile traveling. The late Queen Victoria, for example, was learning politics by instinct when many of her future Ministers were absorbed in the sports of youth or the narrow cares of professional life. Words of warning or encouragement must have fallen with singular force from her lips upon the ears of men upon whom rested the tremendous responsibilities of empire; while the completeness with which she could enforce her undoubted constitutional rights was shown in the famous letter in which she consigned Lord Palmerston to temporary oblivion in 1850. On that occasion Her Majesty simply insisted upon her undoubted right to be distinctly informed of every event, in contemplation or progress, which might result in an act of the Crown, «in order that she may as distinctly know to what she is giving her royal sanction.»

Of late years suggestions have from time to time been made to the effect that the occupant of the throne should take a more personal and ostentatious part of the details of government. These suggestions not only savor of the political backwater, but they are singularly ill-advised in the interests of the monarchy. Britons feel so keenly upon political matters, that any one, however exalted, who takes part in controversial or debatable matters, inevitably meets with hostile criticism and periods of unpopularity. From such untoward accidents the Crown is entirely saved by virtue of its present unique position. Even where, as during the last two eventful years of the Balfour Ministry, the policy of the government was unpopular with the majority of the community, no one dreamed of blaming the King, for everyone assumed that he had nothing to do with it. «The King has no politics, and no one knows to which party he belongs.» How different was the attitude of the country to George III during the long period in which he strove to restore the older type of monarchy. But perhaps the most complete testimony to the success of the present system, so far as the Crown is concerned, is the fact that republicanism, even as an academic ideal, has practically ceased to exist in the British Empire. Among all the schemes of political reform which are from time to time mooted, no one ever contemplates the disappearance or modification of the powers of the Crown; for the very good reason that the Crown, so far from being a stumbling-block in the way of reform, is seen to be capable of being employed as a valuable instrument to secure it. The working of the Cabinet system makes the Crown a splendid fixed sun, surrounded by a constellation of rolling planets destined, from time to time, to disappear from sight. No one becomes tired of the sun, because the desire for occasional change, planted in every human breast, is satisfied by the appearance and disappearance of the planets. The Cabinet system may be open to severe criticism; but its defects will not be amended by any change which will reduce the monarch from his proud position as head of a united nation, to the leadership of a faction of irresponsible politicians, opposition to whom would mean opposition to the avowed personal wishes of the Crown.

Bibliography.— Considering its importance, very few writers have attempted to deal in detail with the history and working of the Cabinet system. The following works will be found useful in studying the subject. *History:* Morley, 'Walpole' (English Statesmen Series); Jenks, 'Parliamentary England' (Story of the Nations Series). *Working:* Bagehot, 'The English Constitution' (1867); Hearn, 'The Government of England' (chaps. viii-x); Anson, 'Law and Custom of the Constitution' (part II, The Crown, chap. iii, 3d ed., Oxford 1909); Traill, 'Central Government' (English Citizen Series).

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14. THE JUDICIAL SYSTEM IN ENGLAND AND WALES. The English judicial system, like the English law, grew up naturally and spontaneously. It is of native growth. It has never been constructed *en bloc* on any scientific or strictly logical principle; but it is perhaps none the worse for this. It still contains anomalies, which are relics of Anglo-Saxon custom or Norman feudalism; but such anomalies are historically interesting and do not at all seriously impede the working of the more modern machinery.

We now draw a sharp distinction between courts of civil and courts of criminal jurisdiction. In the former debtors are compelled to pay the money which they owe, and wrongdoers to compensate those whom they have injured; so that the proceedings, if successful, generally end in a judgment that the defendant shall pay the plaintiff so much money. The object of criminal proceedings, on the other hand, is to punish more serious offences and to prevent their repetition. Hence these proceedings, if successful, terminate in a sentence inflicting fine or imprisonment on the offender. And for each purpose we now have separate courts. This was not so formerly. At the time of the Norman conquest the most important tribunal in England was the Shire-gemôt, or County Court. This court took cognizance of felonies, breaches of the peace, nuisances, and other offences which concerned the State, as well as of actions involving title to lands and other civil suits, which concerned only the individual suitors; it also heard appeals from inferior tribunals, such as the hundred court. In Saxon times the County Court met twice or thrice a year. In the 13th century in the larger counties it met every month.

Under Henry II the royal power made itself felt throughout the kingdom. His justices in eyre made their circuits through the land and tried the more important civil and criminal cases in the County Court. By the Assize of Clarendon (1166) all landholders were obliged to attend twice a year to meet the King's justices. This was the origin of the County Assizes. To this day the King's judges still come at least twice a year into every county in England. To the larger counties two judges come together, one of whom tries civil causes and the other criminal cases —

> "The great judge and the little judge,
> The judges of a size!"

From the ordinary meetings of this ancient County Court are descended both the County Quarter Sessions and the modern County Courts. At the Assizes any crime can be tried which had been committed within the county, whether treason, felony or misdemeanor. At Quarter Sessions no crime can be tried, which is punishable with death or imprisonment for life (except burglary); other grave offences, such as perjury and forgery, are also excepted. These Sessions are held at least four times a year in each county; the justices of the peace for the county — unpaid laymen — are the judges.

The civil jurisdiction of the ancient County Court had become almost obsolete, when the County Courts Act of 1846 was passed. This act created the modern County Court, which is held in every town of any size in England at least six times a year. Actions for breach of promise of marriage, libel, slander and seduction cannot be commenced in the County Court; nor can actions of ejectment or any other action involving the title to any land worth more than £50 ($250) a year, or to any toll, fair, market or franchise; nor any action of contract or tort, in which the plaintiff claims more than £100 ($500). This latter does not apply to actions under the Workmen's Compensation Act, where no limit is fixed. Outside of London the County Courts have jurisdiction in bankruptcy. There are 57 County Court judges; they are appointed by the Lord Chancellor, and must be barristers of at least seven years' standing.

So much for the counties. But even in Anglo-Saxon times, cities such as Winchester, York and London had acquired the right of holding courts of their own in which an officer appointed by the citizens themselves would decide all civil disputes which arose within the limits of the city, and also exercise some criminal jurisdiction over the citizens. In less important towns, however, it was found difficult to exclude the jurisdiction of the County Court. But in the 13th and 14th centuries the policy of the Crown was to strengthen the towns in order to create a counterpoise to the power of the nobles. The three Edwards and Richard II granted many charters to boroughs, which created borough courts of criminal and in some cases also of civil jurisdiction. The citizens were proud of these local courts, for they were a badge of their independence. Some of them have fallen into disuse; from the others are directly descended our present Borough Courts of Quarter Sessions and our civil Borough Courts of Record.

In 111 of the larger towns in England and Wales there is held at least four times a year a Court of Quarter Sessions, which has the same criminal jurisdiction and adopts the same procedure as the Court of Quarter Sessions in a county. The judge of each of these courts is called a Recorder. He is the sole judge of the court, for although the justices of the peace for the borough are often present on the bench, they take no part in the proceedings. A Recorder is appointed by the Crown on the recommendation of the Home Secretary. He must be a barrister of not less than five years' standing. He is *ex officio* a justice of the peace for the borough. He may sit in Parliament for any other constituency but not for the borough for which he is Recorder. The Recorder of London is judge of the Lord Mayor's Court, with a salary of $20,000. He is appointed by the King. There are 118 recorders in England and Wales, and five in Ireland.

In 18 of the largest cities or towns there exists also a Borough Court of Record of civil jurisdiction — such for instance as the Mayor's Court, London; the Court of Passage at Liverpool; the Salford Court of Record, and the Tolzey Court at Bristol. The jurisdiction of these courts is generally limited to causes of action arising within the borough, but unlimited as to the amount which can be claimed in the action. In most of them the Recorder of the borough is the judge.

When our Plantagenet kings were firmly established on the throne, judicial power became more centralized. The King's Council gradually extended the scope of its operations. It acquired important judicial functions; it became a court in which the King, in theory, was always present. From this council sprang gradually the courts of King's Bench, Common Pleas and Exchequer; which for many centuries were the three Superior Courts of Common Law at Westminster.

Then as civilization advanced, it was found that the rigid rules of the common law required modification to meet special cases. Ancient custom had to yield to improved morality. The Lord Chancellor, who was at first an ecclesiastic, became «the keeper of the King's conscience.» He presided over the Court of Chancery, which soon assumed power to restrain suitors from «unconscientiously» enforcing their strict legal rights. This Court of Equity, which usually sat in Lincoln's Inn, thus acquired control over the three courts of law at Westminster. Two systems of judicature in fact flourished side by side, which were in many respects at variance with each other. What was right at law was often wrong in equity. Judgment would be given on the same facts for the plaintiff in Westminster Hall, for the defendant in Lincoln's Inn.

By the end of the 18th century the Court of Chancery had become more technical, if that were possible, than the courts of common law themselves; its procedure had ceased to be elastic; it would only grant relief in certain specified cases. A plaintiff, who had undoubtedly a strong moral claim, was constantly told that he had no equity. And both at law and in equity, cumbrous procedure, technical pleadings and preposterous rules of evidence caused the suitors much vexation of spirit, much unnecessary expense, and worst of all, intolerable delay. «Lord Eldon and the Court of Chancery pressed heavily upon mankind» (Bagehot).

Attempts were made from time to time to deal with this state of things by legislation — notably by the Common Law Procedure Acts of 1852 and 1854, the Chancery Procedure Act, 1852, and the Consolidated Orders in Chancery of 1845 and 1860. At last in 1873, Lord Selborne, then Lord Chancellor, with the assistance of Lord Cairns, his opponent in politics, carried successfully through Parliament the Judicature Act, which came into force on 2 Nov. 1875. This act created the Supreme Court of Judicature, which administers law and equity concurrently. Its procedure is straightforward and simple. Every court now applies the same principles of law and equity to the actual facts of the case; every court has power to grant whatever form of relief the nature of the case may require, whether legal or equitable. This was the greatest and most beneficial law reform of Queen Victoria's long reign. On 4 Dec. 1882 outward expression was given to this fusion of law and equity by physically uniting the courts in one building — the new Royal Courts of Justice.

The Supreme Court of Judicature is composed of the Court of Appeal and the High Court of Justice. Thus the civil courts at present are: The County Court, the Borough Court of Record, the High Court of Justice, the Court of Appeal, the House of Lords and the Judicial Committee of the Privy Council. The High Court of Justice is divided into the Chancery Division, the King's Bench Division and the Probate, Divorce and Admiralty Division.

The Chancery Division has now six judges who work in pairs, each pair having four masters and a staff of clerks working under them. The bulk of the work of the Chancery Division consists of the equity business, to which its organization is especially adapted. Its powers are, nevertheless, not confined to any particular subject-matter; it administers law as well as equity, though it never tries a case with a jury.

The Lord Chief Justice of England, assisted by 15 puisne (i.e., junior) judges, conducts the business of the King's Bench Division. These judges try civil causes either with or without a jury; they preside at the Assizes, civil and criminal, all over England and Wales; they hear appeals from County Courts and magistrates, and prohibit all inferior tribunals from exceeding their jurisdiction.

In the Probate, Divorce and Admiralty Division there are two judges who decide as to the validity of wills, grant divorces and manage the admiralty business of the country. One of them is styled the «President» of the Division.

The rules of court made under the Judicature Act have defined the procedure in the High Court of Justice, which is simple and elastic. A Master now decides all interlocutory matters on a summons for directions, e.g., whether the action shall proceed with or without pleadings, with or without a formal trial, with or without discovery of documents and interrogatories as the nature of the case requires. Every amendment in any record, pleading or proceeding that is requisite for the purpose of deciding the real matter in controversy can be made at any stage of the proceeding.

The Court of Appeal is composed of the Master of the Rolls and five Lords Justices, with the occasional assistance of the Lord Chancellor, the Lord Chief Justice of England, and the President of the Probate, Divorce and Admiralty Division.

The Lord Chief Justice of England, the Master of the Rolls, and the Lords Justices are appointed by the Prime Minister; the puisne judges of the High Court of Justice are appointed by the Lord Chancellor. The latter is *ex officio* chairman of the House of Lords and has a seat in the Cabinet. He goes out of office with the government. (See *Lord High Chancellor*).

From the decision of the Court of Appeal, appeal lies to the House of Lords — to the judicial body known by this name, not to the legislative assembly. An ordinary peer of the realm can no longer sit in the House of Lords when it is exercising judicial functions. The Judicial Committee of the Privy Council hears appeals in ecclesiastical matters and also from the colonies. These appellate courts will probably soon be merged in one; they have been strengthened by the appointment of six paid Lords of Appeal in Ordinary. A Court of Criminal Appeal was established in 1907, to which any person convicted on indictment may appeal on a question of law, or, by leave, on a question of fact, or against the sentence unless that is fixed by law. But there is no power to order a new trial.

The criminal courts now are: The Magistrate's Court, the Borough Quarter Sessions, the County Quarter Sessions, the Assizes, the Central Criminal Court, the King's Bench Division of the High Court of Justice and the Court for the consideration of Crown Cases Reserved.

The proceedings usually commence with a *summons*, bidding the accused appear in court before the magistrates on a certain day: in some cases a *warrant* will be issued at once for his arrest. Simple matters are disposed of summarily by the magistrates. Graver cases are sent for trial to Quarter Sessions or to the Assizes. In these graver cases, the prosecution states in detail the precise charge against the prisoner in a pleading which is called an *indictment*. This is laid before a *grand jury;* and the accused will not be put on his trial unless the grand jury think that there is a case against him fit to be tried. If the grand jury is of this opinion they return the indictment into court, marked «True bill,» and the prisoner is then *arraigned*. In some few cases the prisoner must state his defense in a written *plea;* but, as a rule, he merely pleads «guilty» or «not guilty» orally from the dock. If he pleads «guilty,» or if after pleading «not guilty» he is tried and convicted, he may be sentenced to fine, imprisonment, or death, according to the nature of the crime which he has committed.

The Central Criminal Court — better known as the Old Bailey — tries all treasons, felonies and misdemeanors committed in the Metropolitan district or within the jurisdiction of the admiralty. The lighter crimes are usually disposed of by the Recorder of London or the Common Sergeant; the graver by a judge of the High Court, who attends for the purpose. This court is at once both Assizes and Quarter Sessions for the city of London, and assizes for the counties of London and Middlesex and for certain specified portions of the counties of Essex, Kent and Surrey.

The King's Bench Division occasionally exercises jurisdiction as a court of first instance in cases of grave public importance, such as the trials at bar of Dr. Jameson and Colonel Lynch in 1896 and 1903 respectively. It also has an appellate jurisdiction over cases brought before it on writs of error or certiorari or on «special cases» stated by justices of the peace.

The court for the consideration of Crown Cases Reserved was the only criminal court of appeal till 1907, when its jurisdiction was transferred to the Court of Criminal Appeal. That court consists of eight judges of the King's Bench division and the Lord Chief Justice of England. The number of judges sitting in the Court of Criminal Appeal must be an uneven one, and not less than three.

In the County Court and before magistrates, solicitors act as advocates. In all the other courts only barristers can be heard at the actual trial, or on «appeal»; though solicitors are allowed to argue minor questions in Judges' Chambers. A barrister must be a member of an Inn of Court; he must have passed the bar examination, and then have been «called to the bar» by his Inn. The four inns of Court in London possess the monopoly of calling men to the bar; they will not «call» any woman. In litigation in the High Court it is necessary to employ both a solicitor and a barrister; the solicitor prepares the case for trial, and «instructs» the barrister by delivering a «brief» to him. Solicitors also dispose of a vast amount of non-litigious business. Every solicitor must have been articled to a solicitor for at least three years, and must have passed the Solicitors' Examinations at the Law Institution in Chancery Lane, London, W. C.

For further information the reader is referred to Odgers on 'Pleading and Practice,' (London 1891 — now in 7th ed.), on 'Local Government' (2d ed., London 1906), 'Odgers on the Common Laws of England' (1911), and 'Bullen and Leake's Precedents of Pleadings' (7th ed., London 1915); Kenny's 'Outlines of the Criminal Law' (2d ed., Cambridge 1904); Broom's 'Common Law' (9th ed., London 1896); 'A Century of Law Reform' (London 1901).

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15. LOCAL GOVERNMENT.

As in other large and populous countries, the work of government in England* is classified as being either national or local. This classification has no reference to the place in which the work is done or to the area benefited; in England at any rate, it is based in practice — whatever may have been its origin — exclusively on the systems upon which these two branches of public administration are organized and controlled. That part of the work of government which is undertaken by the national organization of the state, directed from its capital, and administered under the direct orders of its executive head or principal legislature is termed national government; and is, indeed, by historians, politicians, and citizens alike, often exclusively thought of as government. That part which is left to subordinate organizations, relating only to particular geographical areas within the state; and which is immediately directed by and responsible to authorities belonging to those areas, subject only to more or less supervision, help, and superior control by the national government, is termed local government. In England and Wales, even more than in most other countries, the choice of the particular functions of government to be thus left to local authorities, and the amount and kind of the supervision, help, and superior control exercised by the national government in respect to each of these functions, have been determined rather by historical antecedents than by any consistent or logical theory. The aggregate amount, variety and relative importance of local government has, during the past three-quarters of a century, steadily increased; until it has come in the United Kingdom, nearly to equal in magnitude (measured by the annual cost of administration) that of the national government itself. This increase has not been due to any transfer of services from the sphere of national to that of local government. Such few transfers as have occurred (like that of the prisons in 1877) have been actually in the other direction. The enormous development of English local government has been due, partly, to the great expansion of the cities, which need more government than rural districts, partly to the progressive demand for new and increased services such as schools and libraries, and partly to the tendency to transfer the administration of services of common use from the sphere of private to that of public — usually local — administration.

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* With England is included Wales and the Scilly Isles, but not Scotland or Ireland, which have entirely distinct systems of local government; as have also the Channel Isles and the Isle of Man. The differences are, however, greater in terminology and form than in substance.

THE SERVICES ADMINISTERED BY LOCAL AUTHORITIES.

The government at present entrusted to local authorities in England and Wales may be divided into four great classes, which we may term respectively the collective organization of public services, the collective regulation of individual conduct, the collective provision for special classes of the community, and the collective taxation upon individual citizens by which the net cost of the whole of the local government work is met. It has been a consequence of the great development of local government during the past three-quarters of a century, and of the absence of any logical or deliberately thought out plan of organization, that this or any other systematic analysis of local government functions does not correspond exactly with any definite classification of local governing bodies. We must therefore describe separately function and structure.

The collective organization of public services, though later in its great development than some other branches, now make up the largest part of English local government.

1. Protection.— We have first the fundamental service of the protection of the individual citizen against aggression, for which there is, from one end of England to the other — not excluding even the most rural or the most desolate regions — a series of salaried, professional and highly organized local forces of preventive police. In marked contrast with the practice of most other European countries (and, indeed, with that of Ireland), these police forces, nearly 200 in number, are (with the exception of that for the metropolitan area) exclusively under the control of the respective local authorities, and are subject neither to orders from, nor to control by the national executive. They are (outside the metropolitan area) entirely appointed, controlled, and paid by particular local authorities; in municipal boroughs, the town councils by their «watch committees»; in counties, by what are known as «standing joint committees,» of which half the members are chosen by the County Council and half by the Justices of the Peace in Quarter Sessions. The total cost of maintenance of the provincial police forces is about three and a half million pounds, and that of the two metropolitan forces two and a half million pounds per annum, for which nearly 50,000 men are maintained. A separate grant of part of this cost (at first a quarter, latterly one-half) was long made from the national exchequer, conditionally on the local authority (1) permitting the Home Secretary to have its force inspected annually by an officer appointed for the purpose, (2) maintaining it at such a standard of strength and efficiency as the Home Secretary might consider satisfactory. No separate police grant is now made, the amounts (aggregating over £3,000,000 per annum) having been merged in larger general contributions in aid of local authorities; but a certificate by the Home Secretary that the above conditions have been fulfilled is still annually required before payment is made. In the metropolitan district (which for this purpose extends to an area of more than 15 miles radius from Charing Cross) there are two police forces; one of small size, maintained by the Corporation of the City of London, without exchequer aid or Home Office inspection, for the protection of the one square mile of the old city; and the other the largest in the world, organized as a local force, but commanded without any shadow of local control, by officers appointed by the national executive itself (Home Office); at the cost, partly of a fixed local rate of six pence in the pound, which meets about half the expense, and partly of the national exchequer; for the protection of the 900 square miles of the metropolitan area. ('Annual Home Office Reports as to Police'; 'History of Police in England,' by W. L. M. Lee, 1902).

While the central courts of justice form part of the national government, some of the minor tribunals are (though the judges are never elective) supplied by local government, either in form of (a) petty criminal courts held by the local justices of the peace; (b) the more important Courts of Quarter Sessions, held by the same, (c) stipendiary police magistrates in various cities, appointed by the national executive, but paid for by the cities themselves; and (d) a few local civil courts maintained in the city of London and some other of the older cities. The stipendiary police magistrates in the metropolitan district (outside the old city) are maintained in the same way as the metropolitan police force. ('Justice and Police,' by F. W. Maitland).

Protection from fire is afforded by separately organized fire brigades, having no connection with the police. These are in all cases exclusively under the control of the local authorities; in London, the County Council; in the municipal boroughs, the Municipal Corporation; in other places, the Urban District Council, or the Parish Council. In London, the fire brigade is second in size and cost only to that of New York, and it is not clear whether, for the particular conditions of its task, its efficiency is second to that of any in the world. Its strength is nearly 1500 men, and its cost over a quarter of a million sterling annually toward which the fire insurance companies have to contribute a trifling percentage of the value they severally insure in London, and the national exchequer unconditionally contributes £10,000 a year in respect of the large amount of national property in the metropolis. Some of the provincial cities have also salaried professional fire brigades, often highly efficient. In less populous centres, according to the unfettered discretion of the particular local authority in each case, the fire protection passes by insensible gradations (some salaried professionals, men in other occupations partially paid for fire service, or unpaid but organized volunteers) down to the mere provision of a hand pump and buckets, to be used by any zealous citizen. Protection against fire in theatres and music halls, and against such methods of building houses generally as might facilitate dangerous fires, is afforded, in the metropolis, by the stringent regulations and inspection by the London County Council under its special building act. In other towns the Municipal Corporation takes such action of a similar kind as it thinks fit, by way of by-laws. Protection against drowning is afforded in the bathing season by the boats and boatmen provided by only a few seaside municipal corporations. The lighthouse service is maintained at national expense by the Trinity House, an ancient corporation, now essentially a branch of the national executive (Board of Trade).

2. **Locomotion.**— In so far as locomotion is not abandoned to private enterprise (railways, most river steamers, some tramways, omnibuses, etc.), the whole provision for this service is left in England to the local authorities. The maintenance of roads, now assisted by the national department styled the Road Board, is performed, over every part of England and Wales, by one kind of local governing body or another. Within London, it is the council of the particular metropolitan borough; in the municipal boroughs, it is the corporation; in other towns, it is the urban district council; and wherever none of these authorities exist, it is the rural district council which is responsible for this service. The method and standard adopted in each locality is left to the unfettered discretion of its local authority, which (for the 100,000 miles of by-roads) has itself to bear all the expense. But for what are deemed main roads (apart from London and the principal cities which are called county boroughs), the county council either itself undertakes the service or else contributes to the minor local authority a sum agreed between them as the cost of keeping up such main roads, of which there are 30,000 miles. The average amount per mile annually spent on road maintenance is main roads £60; by-roads, £20; but these sums are largely increased in the growing mileage of roads now treated by preparations of tar so as to be adapted to the rubber tires of automobiles. The county council, outside London and the county boroughs, moreover, maintain the bridges over streams, etc., with some exceptions. Where, as in urban districts, the road becomes a street, its maintenance naturally becomes more costly, and altogether new needs of paving, cleansing, and lighting arise, to be dealt with and paid for in each case by the local authority concerned, at its unfettered discretion. Further developments of the same service, undertaken under special powers, are the short lengths of canal of the Exeter and York municipal corporations, and the extensive canal navigation owned and operated by the Gloucestershire county council; the harbors, piers, and docks maintained by the Port of London authority, the Mersey Docks and Harbors Board and about 60 other local authorities; the numerous bridges over the Thames, constructed and maintained partly by the Corporation of the City of London, partly by the London County Council; similar bridges over rivers in other cities nearly always maintained by the local municipal corporation; the great tunnels under the Thames constructed by the London County Council; a few old-fashioned ferry services maintained (as at Saltash, Middlesbrough, and Sunderland) by various local authorities; the development of the ferry into a moving "floating bridge" by the corporation of Southampton; and into river steamboat services across the Mersey by the Corporation of Birkenhead, and across the Thames at Woolwich by the London County Council. In other directions the road has been developed into a tramway; and cars — steam or electric — are now owned by more than a hundred local authorities, and operated under municipal management by an ever increasing number of them (in 1918 nearly 50), including the valuable miles of track worked by the London County Council, with gross receipts from fares which, in a normal year may be put at more than £2,000,000 sterling. In a number of cities the municipal corporation has obtained exceptional power to run an omnibus service in conjunction with the tramways. In all other cases the omnibus service is left to private enterprise. A few bridges constructed by groups of capitalists, with power to charge tolls, are still in the same position, as are most of the canals, and all the railways and coast steamboats. The 19th century saw a marked tendency toward freeing from toll the use of the various means of locomotion maintained by local authorities. Their roads and streets — once barred to all but pedestrians by tollgates — are now invariably free; the bridges, on many of which even pedestrians were charged a toll, are now (with the exception of a few capitalistic ventures, still in private hands) uniformly free; the tun-

nels under the Thames are free to vehicles as well as to pedestrians; the steamboat service by which the London County Council maintains the Woolwich ferry is equally free; while the tendency in the municipal tramway, canal and steamboat services is to charge only the smallest fares or tolls e.g. «halfpenny fares» for short stages.

3. **Water Supply.**— The supply of water is only in a steadily diminishing number of cities, of which the largest are Bristol and Newcastle, a matter for private enterprise. In 1600 boroughs and urban and rural districts this public service is in the hands of the local authority, usually the municipal corporation, or (as in the metropolitan district), of a council made up of representatives of different local authorities, the aggregate amount of capital invested in these public water enterprises being about £200,000,000 sterling. It is now generally thought to be a defect that there is no systematic distribution, among the great centres of population, of the natural water basins; and no provincial authorities entitled to control them.

4. **Heat, Light and Power.**— Gas for lighting, heating, and power is produced and supplied under the authority of separate statutes, in about 700 cities and towns, besides a number of smaller installations started without statutory powers. These gas works were, in their origin, mostly private enterprises (though the local governing body of Manchester started its own gas works in 1816), but there has been a steady tendency to municipalization, until more than 200 towns already govern their own gas production, with a capital of £50,000,000 sterling invested in their enterprises. During the last quarter of a century on an average five cities a year have municipalized their gas supply; and as these comprised a majority of the smaller consumers, about one-half of the entire number of the users of gas in the United Kingdom are thus co-operatively supplied by themselves as citizens (Annual Returns as to Gas Works, Board of Trade). Electricity, starting only within the past half century, has been even more predominantly a matter of municipal enterprise. Nearly 200 towns have their own municipal electricity supply, in which some £40,000,000 sterling is now invested. In Manchester the municipal corporation supplies also hydraulic power.

5. **Education.**— The extensive public service of education — as a function of local government scarcely a generation old — now makes up more than a fifth of the total expenditure of the local authorities. While the national executive, by contributing more than half of this expenditure on education, exercises great influence by means of the conditions which it attaches to its grants, the power of the local authorities to provide what kind and what amount of educational facilities they deem fit over and above the national minimum, is (so far as secular subjects are concerned) now practically unlimited. There is no limit to their current expenditure, or to the amount of rate they may levy. There is no limit of grade or of age. Anything that is education — whether elementary, secondary, or university in grade; whether infant or adult; whether literary, scientific, artistic, technological or professional in kind — the local authority may, if it chooses, provide, without requiring any sanction or approval, in whatever way it chooses, under whatever regulations it chooses, gratuitously or at any fee. It is legally restrained only (1) by the statutory exclusion (or only conditional admission) of religious instruction in the nature of a catechism distinctive of any particular denomination; (2) by the statutory obligation to provide at least the «national minimum» of efficient elementary schools for all children between 5 and 14 requiring elementary instruction; (3) by the need for sanction of any projects for raising funds by loans. In practice, the dislike of the citizens to an undue increase in the rates restrains the local authorities at present to a comparatively limited use of their vast powers. While elementary schools, of one sort or another,— now always compulsorily attended and, with trivial exceptions, absolutely free of charge — exist in adequate numbers, there is still an insufficient supply of secondary schools, apart from those maintained from ancient endowments, under separate governing bodies; and whilst, in most cities, much has been done for technological education of an elementary grade, the provision for university education and the higher technological instruction is, compared with the need, now recognized as inadequate. For everything above the elementary school, fees are charged. On the other hand, London has a «scholarship ladder» unequaled in extent and genuine accessibility anywhere in the world. By an unlimited provision of free places coupled with maintenance allowances, awarded on a merely qualifying examination, the opportunity for secondary and university education is effectively opened even to the poorest child of more than average ability. Nearly all other local authorities have less extensive scholarship schemes on similar lines. The result is that the percentage of the population enjoying secondary schooling is greater in London and various other English cities — notwithstanding the fee-paying system — than it is in Chicago or even in Boston.

6. **Miscellaneous Services.**— Brevity compels the grouping together of a large number of diverse public services organized and administered by local authorities. With the exception of a few ancient chartered rights in the hands of private owners (of which Covent Garden in London is by far the most important), the markets are in public ownership, involving a total capital of some £10,000,000 sterling, and (while a few are leased) usually under public administration; often including warehouse accommodation, weighing machines, sometimes cold-storage and abattoir. The municipal provision of workmen's blocks in towns and of cottages in the country has been carried on to a great extent, not only by the London County Council, which had already in 1916 over 30,000 people in its dwellings, but also by about 100 other authorities. ('The Housing Handbook,' by W. Thompson, 1904). The existence of a few «joint-stock» cemeteries serves to remind us that the provision and management of burial grounds is an important function of the local authorities, in which millions of capital is invested, extending in one or two cases (as at Hull), to the provision of crematoria. Interment is, however, the business of the undertaker, and remains everywhere in private hands; not even subjected, as is the case in some continental cities, to public con-

trol. The provision of parks and recreation grounds, with bands of music, gymnasia, facilities for games, etc., has been lavishly undertaken. Hundreds of cities and towns have free public libraries and reading rooms; others have also public picture galleries and museums which are uniformly free; while a couple of hundred places provide for their citizens swimming and other baths, and public laundries, at low fees. Among the other miscellaneous public services maintained by English local authorities are the Bradford "conditioning house," or wool-grading establishment, the Burnley municipal cold storage, the Doncaster race course, and various municipal supplies of sterilized milk. The tendency of local authorities to embark in these enterprises had led to a discussion of what is called "municipal trading," during which municipalization has proceeded at a greater rate than ever. (For the abstract case against this tendency, consult 'Municipal Trade,' by L. Darwin (1903); for an equally abstract defense, 'The Commonsense of Municipal Trading,' by G. Bernard Shaw (1904), and 'Mind Your Own Business,' by R. B. Suthers (1905); for statistics, 'The Municipal Yearbook' and 'The London Manual' (both annually); the seven volumes of 'Local Taxation Returns' annually published by the Local Government Board; and the periodical return of 'Reproductive Undertakings carried on by Municipal Boroughs,' also issued by that office.) In 1916 the amount of capital under municipal management cannot be put at less than £1,000,000,000 sterling; the aggregate municipal indebtedness (all repayable within 20 to 60 years), being over £600,000,000 sterling. Manchester and Birmingham have over £20 per head of population of capital under municipal management.

The part played by local government authorities in England in the collective regulation of individual conduct is less conspicuous than their organization of municipal services, but it is too important to be ignored. It is not merely that practically all these authorities exercise, in their power of making by-laws, a minor legislative function, on which we to a great extent depend for the prevention and suppression of nuisances, the regulation of the streets, all the ramifications of public health, and the operations of building and various noxious trades. If, as in England we must, we include among local authorities the justices of the peace, the regulation of the sale of alcoholic drink, the places where it may be sold, and to some slight extent the hours during which the sale may take place, fall within the discretion of local governing bodies. Finally, in the direction and control of all the provincial police forces, the local authorities have virtually extensive and scarcely defined opportunities of supervising and restraining any overt manifestations of individual conduct which is "disorderly in character," and of which local public opinion disapproves.

The collective provision for special classes of the community is one of the oldest and was, until lately, the most costly of the functions of local government in England. Under the comprehensive term of the Poor Law there is now included a whole array of specialized provisions for orphan and deserted children, for the sick, for persons of unsound mind, for physical and mental "defectives," for the aged and infirm, and for the men and women who become destitute, together with their children. The total amount spent on this service is about £15,000,000 sterling annually. Beyond the ancient limits of the Poor Law, and still within the sphere of local government, we have, in addition, the provision of hospitals for lunatics, idiots, and epileptics; the costly arrangements for maintaining and medically treating those suffering from any infectious disease; and the organized provision now made for the temporarily unemployed — making an aggregate annual expenditure from public funds on the care of particularly distressed or afflicted classes of the community, falling not far short (apart from education) of £30,000,000 sterling.

The taxation by which the local authorities maintain all these services (apart from the revenue of municipal property, the receipts from municipal services and contributions from the national exchequer), is levied entirely by themselves. They cannot create a new tax, but once the kind of impost is authorized by Parliament, the rate at which the citizen shall be charged is, as a rule, left to the unrestrained discretion of the local governing body. In amount, there is no limit to its taxing power. Of the total gross revenues of the English local authorities (apart from loans), which may roughly be put at about £150,000,000 sterling, about £30,000,000 is received from the national exchequer, leaving some £120,000,000 to be raised locally. Of this nearly £30,000,000 is derived from the receipts from the various municipal enterprises that we have described, £5,000,000 from other municipal property, £2,000,000 from fines and fees, and £5,000,000 in reimbursements and miscellaneous receipts, leaving about £78,000,000 to be raised by local taxation. Tolls and dues (apart from those connected with markets and harbors) yield less than a million. The whole of the balance is found by one tax, the so-called "rate," a periodical levy, upon the occupiers of the real estate within the area of each local authority, of a specified proportionate part of the assessed annual value of that real estate. This universal impost, known as the Local Rate (sometimes as the Poor Rate, the District Rate, the Police Rate, etc.), varies widely from place to place, but is most commonly between two and eight shillings in the pound, or between 10 and 40 per cent of the annual rental. The actual average for all purposes, including both urban and rural areas, is usually about four shillings in the pound, equivalent to an annual levy on the capital value of the real estate of abo t one per cent, and to an annual contribution per head of population of about a couple of pounds. It is an interesting and little known statistical fact that the amount of this local taxation per head is only about the same as it was a century ago. This local tax is legally payable by the occupier of every house or farm, or other separate holding of real estate, who (if, as is commonly the case, he is not himself the owner), is left to make his own contractual relation with the owner or "landlord"; normally the occupier pays the rates in addition to his rent. But in "flats" forming part of large blocks, and in property of small annual value, especially that let by the week, the owner usually "compounds" with the local authority, in consideration of a discount to pay the rates himself instead of throwing the burden on the occupier (the so-called "compound householder»), whose rent then includes both rent and rates.

Local Governing Bodies.

English local government is everywhere, and for all purposes, carried on by one particular form of political machinery, which to the Englishman seems so inevitable that he seldom thinks of describing it. The powers and duties of government are vested, not in any officers personally, but in a board or council of members, having jurisdiction, for specific branches of administration, over a definite area. This governing body, which is uniformly unpaid and composed of citizens more or less engaged in their own avocations, appoints, supervises and directs a staff of salaried, professional officers (the «municipal civil service»), by whom the actual functions are performed. The staff of salaried officers is invariably appointed by the governing body; and (though service is nominally only during pleasure), the appointments are habitually permanent, terminable only on death, retirement through ill-health, superannuation or misconduct. There is no such thing in English local government as removal for political reasons, or in order to make a vacancy. The board or council acts collectively, by resolutions agreed to at its meetings by a majority of the members present. Its deliberations are presided over by one of its own number, called chairman or mayor, whom it freely elects; and not by a person separately elected by the people for the presidential position, or appointed to it by some outside authority. Perhaps for this reason, it is a distinctive feature in English local governing bodies that the presiding member has but little personal power or responsibility, apart from presiding. Though in practice he often exercises out of sessions, some executive power, by giving orders to the salaried staff, this is always done in the name of the board or council, and subject to its ratification. The board or council habitually divides itself into committees, each charged with the supervision of a particular branch of the government, and required to report to the main body. The result is an intimate combination of legislative, executive, and occasionally even judicial operations, which the Englishman takes for granted as «administration.» It may be added that national politics have little influence on local government. The salaried staff is almost universally «out of politics.» In many cases, perhaps the majority, the elections are not contested on political grounds, or seriously fought by the political organizations. In London and many of the large boroughs, the elections are thus fought, but the issues are not primarily those of national politics, nor is the cleavage of opinion exactly the same. And once elected, the members (even where the contests have been keen) seldom habitually allow their politics or party divisions to affect their municipal administration.

The organization of local government in England, once extremely complicated, has been much simplified by recent statutes. The era of reform began, indeed, in 1834-35, when the ancient municipal corporations were made elective and systematized, and the Poor Law was placed in the hands of elective Boards of Guardians. Between 1848 and 1875, a system of elective rural and urban district councils was created principally for sanitation and roads. In 1888, the county councils were established on an elective basis, to take over from the non-elective justices of the peace the civil administration of the counties. In 1894, the rural parishes were provided with elective parish councils; and in 1900 the different parts of London with metropolitan borough councils. By these successive statutes every part of England and Wales has been placed under local governing bodies annually or triennially elected on the widest possible residential qualification, women having a vote whenever they are independent householders, and being everywhere eligible for election. There is, speaking broadly, no property qualification for election, and (unlike the English parliamentary ballotings) no obligation on the candidate to provide the election expenses. The members of the local governing bodies receive no salary or other remuneration for their work. Only very exceptionally, in positions such as the mayoralty of an important city, is any allowance paid even for expenses.

In spite of simplifying statutes, English local government is still shared among various strata of different authorities, constituted for different purposes under different statutes. The county of London, with 4,750,000 of inhabitants, has a local government of its own, and must be considered apart. We take first the network of local authorities administering the more obvious services of municipal government, including sanitation and education. To begin with the parish, we see this ancient ecclesiastical area in the rural districts forming the lowest unit of government; administered, if small, by the parish meeting open to all adults; if large, by a parish council triennially elected by the householders. The parish meeting or parish council may light the village, protect the footpaths and village green, establish libraries and reading rooms, baths and public laundries; but its power to tax is limited. Next to it stands the rural district council, dealing with roads and sanitation, triennially elected by and acting for the householders of a group of parishes. Places in which the population has become aggregated together, needing greater and more varied local government services, are (by Local Government Board order) given the status of urban districts. The householders of these urban areas elect an urban district council, which combines the functions of the parish council and the rural district council, with greatly extended powers. A steadily increasing number of urban districts (now over 300 in number) have, sometimes because of past historical importance, sometimes because of present populousness, been given by the Crown (nowadays the Privy Council) the status of chartered municipal corporations; these elect their councils annually by thirds instead of triennially; their councils elect to preside over them, not a chairman but a mayor; and they co-opt into their own bodies additional members styled aldermen. Such of them as have any considerable population (about 130 in number), have their own police forces, under the control of their own town councils. Apart from minor technicalities there is practically no other difference between an urban district which is, and one which is not, a municipal corporation. The words «town» and «borough,» it may be mentioned, are used in England, for any urban place, irrespective of size. The word «city» is of equally lax usage, but it ought to be restricted to those towns, large or small, which have been specifically termed or created cities by statute or royal enactment, together with some others, usually the seats of bishoprics, which bear it by old usage. Above all these bodies stands the county council; elected triennially by the occupiers of houses or lands within the county, whether residing in rural parishes, urban districts or municipal corporations. The county council is the authority for education; it provides the public lunatic asylums; it either pays for or itself maintains the main roads; it administers various minor services for the county as a whole; and it exercises a certain amount of supervision and criticism and some slight control over the minor local authorities. It contributes half the members (the justices of the peace nominating the other half) to the standing joint committee, which controls the county police force.

Most of the boroughs over 50,000 inhabitants (and some ancient towns below that population) stand outside the area of the administrative county, and are neither represented in nor controlled by the county council. These, the so-called county boroughs (now just 75 in number) are entirely autonomous municipal corporations, which have, in addition, the powers of county councils. The town council, elected in the same manner as that of other municipal corporations, and presided over by a mayor (or in 12 of the larger cities a lord mayor) is (apart from the administration of justice and of the Poor Law) the sole local governing authority of the city, with practically unlimited autonomy within the scope of the statutory authority entrusted by Parliament to local authorities generally; and except in a few cases, not even subject, as regards its expenditure on all but one or two subjects, to the general Local Government Board audit. It is an important feature of these county boroughs that they (like the other municipal corporations of any size) mostly have their own police forces, exclusively under the control of their own town councils (by the «watch committee»).

The 4,750,000 persons who inhabit the county of London have a more complex local government than the citizens of Liverpool or Manchester. London is divided into 29 metropolitan boroughs, one of them being the ancient city, preserving still its Corporation, its lord mayor, and other dignitaries and various other peculiarities. These metropolitan boroughs have each a council, elected triennially by the householders, which independently administers the paving, cleansing and lighting of the streets, the minor house drainage, the removal of refuse, the suppression of nuisances and the collection of all the municipal taxes. The City Corporation, in addition, manages, with its own considerable estates, the central markets, some of the bridges and the special city police force. Above these local bodies stands the London County Council, with annual receipts and expenditures exceeding £12,000,000 sterling, with 118 members elected triennially by the householders of the whole administrative county of London, together with 19 co-opted aldermen; and responsible for education, main drainage, parks and recreation grounds, the lunatic asylums, the tramway service, the ferry steamboats, the great street improvements, the demolition of «slum» areas and the erection of new dwellings, the administration of the stringent Building Act and a host of miscellaneous county services, together with the management of the debt of London, not only for its own needs, but also for those of the other local bodies (except the City Corporation). The water supply of the whole metropolitan district, extending to much more than the county area, is in the hands of the Metropolitan Water Board, a body made up of representatives of all the local authorities concerned. The port and river in the hands of the Port of London Authority is constituted in a similar manner. The upper Thames is administered by the Thames Conservancy Board, a body of 28 members, appointed by the Corporation, the Water Board, the County Council and the Board of Trade.

The foregoing survey of English local government omits two branches, which, from historical causes, still retain their separate organizations. Nearly the whole of the collective provision for special classes (but not that for lunatics, nor that for persons suffering from infectious diseases) is in the hands of what are called the Poor Law authorities. The country is for this purpose divided into 653 unions of parishes, often not corresponding with the boundaries of urban districts, municipal corporations, county boroughs or counties. The householders of each of these unions elect either annually or triennially, a board of guardians, which administers the public provision for the aged and infirm, the orphan and deserted children, the indigent sick, the tramps or vagrants, and the destitute of every kind. These boards of guardians levy, for the cost of their schools, infirmaries, work-houses and «outdoor relief,» an unlimited tax on householders, the celebrated poor rate. They have complete discretion as to the amount of money that they will spend, and as to the amount of the relief that they will afford (above the legal «national minimum» of preventing death by starvation); but their discretion as to the mode of relief, as to the erection of buildings, as to the appointment of officers, and as to the raising of loans is guided, and, in the last resort, controlled, by the Local Government Board, which has (in this branch of local government more than any other) the power of issuing peremptory orders having the force of law. In London, where there are about 30 boards of guardians, these have also a joint body, the Metropolitan Asylums Board, made up chiefly of their nominees, which manages the infectious disease hospitals and the asylums for idiots.

The other important branch of local government with an organization of its own, and the only one not upon an elective basis, is that of the Justices of the Peace. These are gentlemen of position (now frequently including trade union officials and other prominent workmen) who are individually appointed by the Crown (the Lord Chancellor), by being included in what is termed the Commission of the Peace. In practice, however, they are almost always chosen by the Lord Lieutenant of the county, who, in most counties, defers informally to the wishes of the existing justices and is now aided by an advisory committee of justices;

Thus, the «County Benches» are, in effect, recruited to a great extent by an informal system of co-optation. The principal function of the justices is that of acting as magistrates. Any one justice can issue summonses to appear and warrants to the police for the apprehension of offenders; any two within each county can hold a petty criminal court («Petty Sessions»), with power to inflict sentences of fine and short terms of imprisonment (subject to appeal to Quarter Sessions), or to commit to prison pending trial at a higher court; and once a quarter, the meeting of justices in «Quarter Sessions» forms a criminal court trying, with a jury, all but the most serious crimes, such as murder and grave felonies. At Divisional Sessions, the justices license retailers of alcoholic drink, nominally at their discretion, but really without effective powers of refusing the renewal of existing licenses, except for grave misconduct. A recent statute enables them to award compensation, charged by a special rate on the district concerned, to the holders of licenses which they withdraw merely on the ground that they are unnecessary. Finally, the Justices in Quarter Sessions, by nominating half the members of the standing joint committee (the County Council sending the other half) go far to control the county police force. It should be said that a slight elective element is infused into the County Benches by the fact that the chairmen of the urban district councils are *ex officio* justices. The county boroughs, and also most of the smaller municipalities, have commissions of the peace separate from those of the counties, and the Justices of the Peace so appointed usually comprise the mayor for the time being, and some leading members of the town council. They have the same judicial and licensing powers (though no control over the borough police force); but in most towns of any size they perform few judicial duties. In many towns there is also a stipendiary professional police magistrate, appointed by the Crown (Home Office) at the request and at the expense of the town council, who relieves the justices of the police court work. In towns having their own Court of Quarter Sessions, the duties of judge are performed by the recorder, also appointed by the Crown (Lord Chancellor), who is always a barrister of position, merely visiting the town for the purpose of holding the quarterly court, and receiving for this duty a small annual stipend.

There remain to be mentioned certain local authorities standing outside the general system. Mention has already been made of the Port of London Authority. At Liverpool and some other ports the port is managed by a harbor trust or board, usually elected by the payers of dock or port dues, including the shipowners, with more or less representation of other local governing bodies. The Mersey Docks and Harbor Board, as the Liverpool port authority is called, administers a series of docks representing a capital outlay of some £30,000,000 sterling. Besides the Metropolitan Water Board, there are a few other special water authorities. There are also a few federal bodies, made up of contiguous local authorities for the joint management of water, drainage, asylums or hospitals. In low-lying or marsh districts there are 300 ancient bodies called commissioners of sewers, appointed in form by the Crown (Lord Chancellor), but practically renewing themselves by co-optation. These bodies maintain the seawalls, sluices and embankments, enforcing on the neighboring landowners their obligations of tenure, and levying on them the cost of necessary common works. The most exceptional of these authorities is that of Romney Marsh, in Kent, where the owners for the time being of 23 ancient estates are, by themselves or their deputies, «Lords of the Level,» with extensive taxing and judicial powers for the maintenance of the great seawall.

RELATION BETWEEN LOCAL AUTHORITIES AND THE NATIONAL EXECUTIVE.

In the matter of the relation between the national executive and the authorities administering the various services of local government, England occupies a position intermediate between that of France on the one hand, and the New England or Western States of the United States on the other. The very real autonomy of the English local governing body — greatest in the County Borough, or in such bodies as the Mersey Docks and Harbor Board or the Commissioners of Sewers of Romney Marsh, and least in the Boards of Guardians — marks it off from any analogous authority in continental Europe. The English local authority for each area is formed without any intervention of the national executive (except in the cases of the Justices of the Peace and the ordinary commissioners of sewers, and then mainly in form only), and entirely independently of its volition. It is, for the most part, not subject to the orders of any part of the national executive; it has, in nearly every case, real and complete discretion as to the manner in which its services shall be rendered or the law of the land carried out; it can, for the most part, determine whether or not a particular service shall be supplied in its locality; in all cases it decides on its own responsibility upon its own budget of expenditure, and (whilst not able to impose a new kind of tax) as to the rate of the taxation — of the kind prescribed by statute — which it will levy upon its constituency; and while in particular instances it is required to obtain the approval of the national executive, either for its projects or to its actual administration, its practical independence is such that a stubborn local authority usually gets very nearly its own way. To an Englishman it is almost inconceivable that a local authority should be appointed, wholly or in part, by the national executive (unless merely in form) — though the Crown nominates a few members to such bodies as the Port of London Authority and the Mersey Docks and Harbor Board, while the Local Government Board nominates members to, and exercises a real control over, the very anomalous Metropolitan Asylums Board — that it should receive and obey orders from the Minister of the Interior; or that it should have to submit its budget for the approval of any superior. On the other hand, no local authority in England — whatever the case may have been in times past — has any original, inherent, or independent powers. With the possible exception of the ancient corporation of the City of London, all the English local authorities of to-day plainly owe their origin to and derive their governmental powers exclusively from the statutes which Parliament has enacted concerning them; and they are, without exception, in all cases, subject to the conditions and limitations of those and any new statutes. A local governing body has, in England and Wales, no rights, powers, privileges or duties inherent in it merely because it is representative of the people of the particular locality; or secured to it by a constitution or other authority independent of the national legislature for the time being. Nor is there in England anything corresponding to the complete separation between the state executive and the local authorities and their mutual independence of each other that characterizes so many of the States of America. Every local authority in England is required by law at least to furnish an annual statement of its accounts to the Local Government Board; nearly all of them have to obtain the approval of that branch of the national executive before incurring expenditure to be met out of borrowed money, and before raising a loan; most of them receive annual grants from the national exchequer in aid of their expenditure on particular local services, and have therefore to comply with the conditions that may be attached to these grants by the Treasury, the Board of Education, the Home Office, the Board of Agriculture or the Local Government Board; finally, nearly all of them have to submit — but the municipal corporations only in respect of part of their work — to an annual audit of their accounts by auditors appointed by and responsible to the Local Government Board. These auditors do not carry out, however, the wishes of the national executive; what they have to do is to prevent disobedience to the statutes of the national legislature. They have, in fact, to act in a judicial rather than in an executive capacity, having no power to override a mere exercise of the discretion of the local authority, but they are authorized, and indeed required, whatever the Local Government Board, or other executive authority might desire, subject to appeal to the ordinary courts of law, peremptorily to disallow and to cause to be refunded, any expenditure that (whether in respect of its subject matter, or by reason of fraud, embezzlement or mere waste) falls outside the statutory powers conferred upon the local authority. It should, moreover, be added that any difference of opinion between the Local Government Board (or other branch of the national executive) and a local authority, or between two local authorities, as to their respective legal powers and obligations, has to be determined (unless by mutual consent) not by the decision of any executive officer or by the national executive itself — not even by any special tribunal which the national executive might influence — but, as in the United States, by the ordinary courts of justice, applying to the dispute the ordinary law of the land, exactly as if it were a dispute between private individuals. In the same way, when a local authority disobeys or fails to comply with any of the statutes, or acts in excess of its powers, it can be coerced to obedience (apart from such disallowance of unlawful expenditure by the auditor, or such withdrawal of financial assistance from the national exchequer as has been already mentioned) only by means of actions in the ordinary courts of justice, which have to be initiated either by aggrieved individuals or by the national executive under the ordinary law.

But any description of the relation between the national executive and the local governing bodies in England would miss the most important feature if it omitted to lay stress on the Grant in Aid. It is the system of grants in aid from the national exchequer upon which the smooth and efficient working of the whole organization to a large extent depends. The expressed purposes of these grants in aid are (*a*) to assist poor localities, and prevent the local rates rising to an oppressive height, by promoting a partial equalization of burden; and (*b*) to induce apathetic or backward local authorities to incur expenditure on local services in which the community as a whole has a strong interest. Even more important to the student of political science is the utility of these national subventions to local government, when given in their most efficient form, in securing national efficiency, without destruction of genuine local autonomy. The basis of English local government is the statutory enactment, by the national legislature, of a minimum standard in each public service (notably in sanitation, education and police), the attainment of which is legally obligatory on every local authority, and is legally enforceable by mandamus. Beyond that national minimum in each public service, each local authority has complete discretion. It can, at the expense of its ever-rising local rates, and subject to the control implied in periodical popular election, do as much or as little as it chooses. But if it chooses to comply with certain specified conditions imposed by the national executive — conditions designed to secure a constantly rising standard of efficiency in particular services — it can (especially in education) obtain national grants in aid of its local expenditure, so calculated as to share the financial burden of increased efficiency between the national exchequer and the local rates. The position of authoritative criticism and ultimate power to withhold the grant, which this relation gives to the national executive — while leaving the local authority both freedom of decision and a genuine choice among methods, as well as complete autonomy in the appointment of officers — appears, on the whole, the best possible device for combining administrative efficiency with local popular control.

Bibliography.— Besides the authorities cited in the text the student should consult 'English Local Government,' by Dr. Joseph Redlich and F. W. Hirst; or 'The Parish and the County,' by Sidney and Beatrice Webb (1906); 'The Manor and the Borough' (1908); 'The Story of the King's Highway' (1913) and 'Grants in Aid' (1911), forming an analytic and historical account of English local government. Brief descriptions of the actual organization of to-day are 'Local Government,' by Percy Ashley (1905); and 'Local Government,' by Dr. Blake Odgers (1902).

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16. THE CIVIL SERVICE. The present organization of the English Civil Service may be said to have originated in the appointment by Order in Council in 1855 of a Civil Service Commission sufficiently strong and independent to check in some degree the then existing abuses of Parliamentary patronage.

In the earlier years of the reign of George III the king had kept patronage in his own hands, and had used it with the single view of increasing his personal power. Edmund Burke's reform of the Civil List (1782) brought in a new and more permanent organization of the government offices, which made royal pressure on the «placemen» more difficult. In 1809 a Superannuation Act had the practical effect of giving civil servants the right to hold their office during good behavior. From 1810 they were paid by salary instead of by fees, and from 1816 the salaries of many posts were provided by a Parliamentary grant. By this time the royal power was exercised by the cabinet ministers, and they, through the «Patronage Secretary to the Treasury,» who acted (and still acts) as Parliamentary «whip,» avowedly used their patronage on the nomination of individual members of Parliament as a means of keeping together a majority in the House of Commons. Lord John Russell, in his 'History of English Government and Constitution' 1823 (page 402), speaks of Parliamentary patronage as being «of late years more completely organized.»

The legislation which followed the Reform Bill of 1832 increased the number and importance of civil service posts, while the growth of the railway system and of other forms of joint stock enterprise made it more difficult for the government to retain its few really able officials. The majority of the persons appointed on the nomination of ministers and members of Parliament were notoriously incompetent. Each party respected the appointments of its predecessor and no one lost his post on a change of government — a fact which, while it mitigated the evils of the spoils system, added to the permanent inefficiency of the service. Occasionally a strong man (like Sir James Stephen, 1789–1859, or Herman Merivale, 1806–1874), was appointed from outside in middle age for special work, but as a rule men were appointed young and were employed for their first 10 or 15 years in copying letters and other routine occupations. The effect on the personnel of the offices is described by Sir Charles Trevelyan and Sir Stafford Northcote (Report on the Civil Service, 1854): «Admission into the civil service is indeed eagerly sought after, but it is for the unambitious and the indolent or incapable that it is chiefly desired. Those whose abilities do not warrant an expectation that they will succeed in the open professions, where they must encounter the competition of their contemporaries, and those whom indolence of temperament or physical infirmities unfit for active exertion, are placed in the civil service.»

The effect on the constituencies was even worse. Sir Charles Trevelyan, writing many years later, says: «Every borough and county except a few of the largest had its local manager on either side — a banker, brewer or solicitor — who purchased the vote and support of the leading men by a judicious application of the loaves and fishes. The corruption so engendered was more constant and general than the bribery carried on by means of money, and it was also more influential, in the degree in which a provision for life for a son or some other person in whom a voter was interested was more valuable than the customary five-pound note.» (Eaton, 'Civil Service in Great Britain,' p. 431).

In 1853 the government appointed Sir Charles Trevelyan, with the late Sir Stafford Northcote (afterward Lord Iddesleigh) as his colleague, to inquire into the whole question. Trevelyan had been (1826–38) in the service of the East India Company and was the brother-in-law of Macaulay, who had been (1832–34) secretary to the India Board of Control and (1834–38) legal member of the Governor-General's Council. In 1833 Macaulay had suggested open competition for the «writerships» of the East India Company as the only effective method of controlling the patronage of the directors.

The Government of India Bill of 1853 carried this proposal into effect, the first open examination being held by the India Board in 1855.

Trevelyan and Northcote's report was presented in January 1854, and proposed open competition for the English civil service, and the separation of the service into higher and lower divisions. Gladstone, as Chancellor of the Exchequer in Lord Aberdeen's government, agreed with the scheme, and civil service reform was promised in the Queen's speech of 1854. Meanwhile the report had been sent round to a number of distinguished educators and administrators whose opinions, mostly pessimistic, were published by the government (Reports and Papers, 1854–55). In March 1854 the Crimean War began, which prevented any large reform being undertaken and the scheme was denounced in the House of Lords, by Lord Malmesbury and others, 13 March 1854, as inconsistent with aristocratic government. Resolutions in the House of Commons in favor of open competition were lost (10 July 1855) and carried 24 April 1856, and in 1857.

In 1860 a strong select committee inquired into the whole question and reported that their own preference was in favor of open competition, but that in order that the government should not go beyond public opinion they recommended the extension of this system of «limited competition» to the civil service generally. The evidence taken by the committee showed that some of the older civil servants still objected to the examination system, even under the conditions which had prevailed since 1855, on the ground that it had introduced «a class of men above their work.»

The recommendations of the Select Committee were accepted by the government, and for the next 10 years a competition between at least three nominated candidates took place for each appointment.

The introduction of household suffrage in towns by Disraeli's «Leap in the Dark» Reform Bill (1867) and the defeat of the Conservative party at the election of 1868, altered the whole political position of the civil service question. The existing aristocratic political families felt that their hold on patronage was gone, and were afraid of the results which would follow from the use of patronage by members of Parliament under the pressure of the newly enfranchised voters. The system of open competition for the Indian civil service introduced 15 years before had worked well, and Gladstone was able to publish (4 June 1870), almost without opposition, an Order in Council throwing open to competition most of the government offices. The Foreign Office and the Home Office (which controls the police) were excepted, owing to a belief that secrecy was better secured by a system of nomination. A few years later (1873) the Home Office was thrown open.

When the post-office took over the telegraphs from the railway companies in 1870 it was found that a few women officials were at work. These were retained, and since then the number of women civil servants has been increased.

Gladstone's Order in Council of 1870 still in essentials regulates admission to the English Civil Service, though alterations of name have occurred, such as the substitution of «Second Division» for «Lower Division» in 1890, and changes of salary, status, and examination subjects.

The system has been worked with a certain amount of elasticity. Men of all ages are from time to time appointed without competition to posts involving special knowledge, and competitive examination is never used in such cases as a test of qualifications. In some cases, as in the starting by the Liberal government of 1892–95 of the Labor Department of the Board of Trade and the Inquiries Department of the Board of Education, appointments have been given without examination to men from outside, although the work to be done is similar to that done elsewhere by civil servants recruited in the ordinary way. Inspectors are practically never appointed by examination, and the «Examiners» of the Board of Education, whose work is practically that of the «first division clerks» in other offices, are appointed by the president of the Board, generally from men who have just distinguished themselves at Oxford or Cambridge. Artisans at the royal dockyards and on other government work are appointed without competitive examination from lists of waiting applicants, and the same method is used for recruiting the police of London (which is under the central government). The younger «second division clerks» are allowed to compete on equal (or slightly more favorable) terms with the outside candidates for first division clerkships, but in no case is competitive examination used as the method of selection for promotion within the service.

Speaking generally it may be said that the English government believes that competitive examination in the ordinary subjects of study is an excellent way of selecting young men for employment at the end of their school or university career, whether at 17 or at 22 years of age, but that it is not effective when applied to men engaged in professional work or as a test of professional knowledge. The fact however that the main body of the officials are appointed by competition has produced an *esprit de corps* which keeps the whole service out of politics, and the exceptional cases of appointment by nomination neither excite nor as a rule deserve criticism.

In 1855 and in 1870 almost all young Englishmen of the well-to-do classes who did not enter the army or navy went through the same course of education in classics and mathematics at the old endowed «public schools» and the two great universities. Professional preparation for the young «gentlemen» followed graduation, and therefore it was very easy immediately after graduation to compare their abilities and acquirements by examination. Those who failed began, without feeling that they had wasted either time or effort, preparation for the Bar or the Church or the «public school» teaching profession, or more often started their professional work with little or no preparation. In the same way an examination for the lower civil service confined to reading, writing, and arithmetic, corresponded to the facts of the time, for few boys who did not go through the public school course learnt much else. Since 1870 the number of «secondary» and «higher grade» schools with a fairly wide curriculum has enormously increased. In 1898 it was found that the old narrow examination for the lower division had become by the mere force of competition a difficult and technical test for which boys left their schools and prepared themselves at crammers. A wider curriculum including modern languages and science was therefore substituted. This fact and the facilities in London and other cities for obtaining higher education in evening classes is tending to lessen the educational advantages possessed by the average first division clerk over a clever and ambitious second division clerk, and to break down the original reason for their life-long difference of status.

Burke in his reform of 1782 not only helped to create the class of professional «civil servants» but attempted to distribute some of their work upon a more logical and economical basis. What we now call «Government Departments» consisted then of the clerical staff attached, either to certain ancient offices of State, such as those of the Lord Chancellor, the Chancellor of the Exchequer, the Postmaster General, and the Secretaries of State, or to Committees of the Privy Council, or to Boards of Commissioners administering other ancient offices such as those of the Lord High Treasurer, or the Lord High Admiral. Each office had «grown» of itself, and new offices had been created as work increased and without reference to any consistent plan. Of the two principal Secretaries of State, for instance, the Secretary of the North conducted all correspondence with the Northern powers of Europe, and the Secretary for the South not only corresponded with France, Spain, etc., but carried on Irish business and the whole police and other work of the «Home» Department. Burke re-divided their duties, making the Northern Department the office of the Foreign Secretary, and the Southern Department that of the Home Secretary. At the same time, England having lost the greater part of her Empire, he suppressed the Colonial Secretary, who had existed since 1768, and who had by hopelessly unworkable arrangement shared his duties with a Committee of the Privy Council called the Board of Trade and Plantations. The work of both was given to the Home Secretary.

But it was not until the period of legislative activity which followed the Reform Bill of 1832 that anything like a complete survey was made of the functions of government, or that any serious attempt was undertaken to create a department for each function. Both the recognition of the need of such a survey and the actual form taken by the redistribution of powers were largely influenced by the suggestions of Jeremy Bentham in his 'Constitutional Code' and other writings.

The Board of Works (Bentham's «Domain Minister») was created in 1832; the Poor Law Commission (Bentham's «Indigence Relief Minister») was created in 1834, became the Poor Law Board in 1847, and was merged in the Local Government Board in 1871; the Committee of Council for Education (Bentham's «Education Minister») was created in 1839 and became the Board of Education in 1899; and the Registrar General (to superintend Bentham's «Local Registrars» of vital statistics) was created in 1837. Separate Secretaries of State were appointed for War and Colonies in 1854, and for India in 1858. A Secretary for Scotland was created in 1885, and a Board of Agriculture in 1889.

At the time of his coronation King Edward VII created the *Imperial Service Order*, with the object of recognizing «more fully . . . the faithful and meritorious services rendered to us by members of the Civil Service of the various parts of our Empire.» Recipients of the decoration bear the letters «I. S. O.» after their names. Within recent years the government have introduced a number of salutary reforms into the complex organization of the Civil Service. New and improved schemes of examination took effect in 1900, 1902 and 1912. A significant change made during 1908 consisted in the grouping of a number of important offices under a scheme of examination intermediate in character between the test for Class I clerkships and that for the second division. This plan had been adopted tentatively for junior appointments under the Admiralty and the War Office, but is now applied to several other offices and is still being further extended. In 1910 all previous orders relating to admission and conditions of service were repealed; such provisions as were then in force were re-enacted with amendments. Power was given to the Civil Service Commissioners, with approval of the Treasury, to prescribe the subjects of examination, limits of age, etc., for second division clerkships. Compulsory retirement at the age of 65 was made applicable to all Civil Servants. A Royal Commission was appointed in 1912 to overhaul the whole institution, including the diplomatic and consular services. After an exhaustive inquiry the Commission published its report in April 1914. One of the suggestions was the creation of two classes in the General Service — the Administrative and the Clerical. The former would practically coincide with the present Class I clerks. The Clerical Class would be divided into senior and junior sections with salaries of $425 to $1,750 and $250 to $1,000 respectively. It is possible for a competition candidate to rise to $12,000 a year. A review of the general results of the competitions which were held from 1870 to 1913 inclusive, shows that 46 competitions took place for an aggregate number of 692 clerkships, exclusive of Assistant-Surveyorships of Taxes. In the 1914 examination Oxford and Cambridge University men secured between them 19 of the 20 posts available in the Home Service, and 42 of the 53 Indian posts. The candidate obtaining the highest marks — 3,876 out of the 6,000 possible — was a student at Rugby School and Trinity College, Cambridge. The Civil Service Estimates (expenditure) for 1918–19 amounted to $320,148,590 for England, Scotland, Ireland and Wales. This also included the Diplomatic and Consular Services, Old Age Pensions, Labor Exchanges, unemployment insurance, education, museums, art galleries, law officers, police, prisons, telegraphs and Pacific cables.

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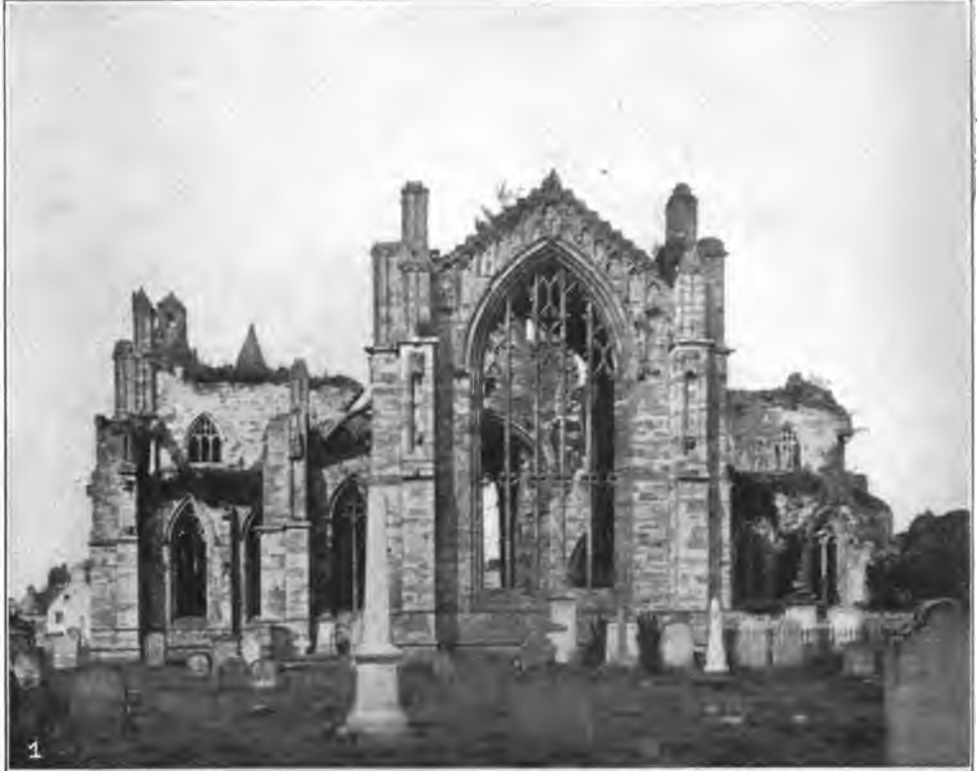
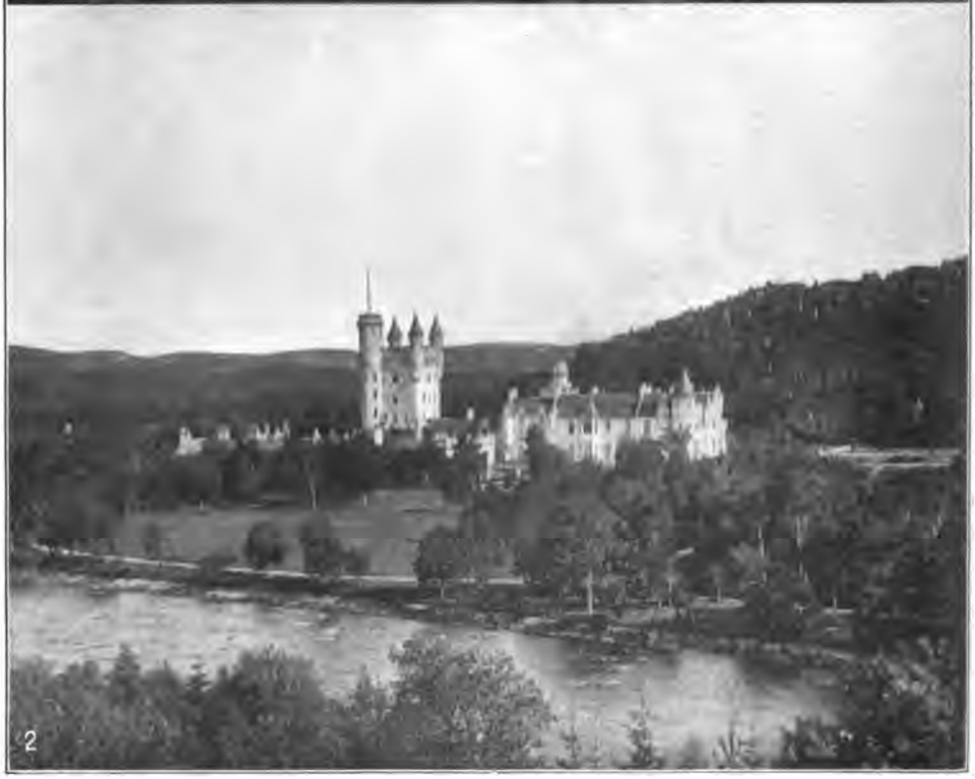
17. SCOTTISH HISTORY. From the Invasion of Agricola in 80 A.D. to the Death of Alexander III in 1286.— In the main lines of its development Scotland has from the beginning been subjected to the same general influences that have determined the civilization of all the countries of Western Christendom. Like each of these countries, however, it has had a history of its own which has given a specific stamp to the character of its people, to its institutions, laws, customs and social arrangements. Among the nations of Europe Scotland has an individuality as distinctive as that of any of its more powerful neighbors, and it has made its own contribution to the general sum of knowledge and to the advancement of humanity.

Remote as is her geographical position, Scotland, from the moment it appears in history, was an integral part of Western Europe. Like England, France and other countries she also came under the domination of the Roman Empire, and her history begins with the invasion of Agricola in the year 80 A.D. In her case, however (and it is a note of difference at the very beginning of her history), the Roman dominion never passed beyond a military occupation, and, except material remains, left no permanent impression of its presence. The next powerful influence that helped to determine the future of Europe was the spread of Christianity, and for this influence Scotland had not long to wait. About the year 563 Saint Columba introduced Irish Christianity into the country north of the River Forth, and by the first

GREAT BRITAIN

Fingal's Cave, Scotland





1 Melrose Abbey, Scotland

2 Balmoral Castle, Scotland

quarter of the 8th century the whole of North Britain came nominally under the jurisdiction of the Bishop of Rome. Christianity was a common factor in the process which led to the formation of the nations of Western Europe, but in Scotland, as in other countries, there were specific conditions that determined the character of her development and permanently influenced the genius of her people. There was first the physical nature of the country, and, second, the fact that peoples speaking different languages divided the land between them. As far as her internal history is concerned, the dominating physical fact was the division of its surface into a Highland and a Lowland country. The River Forth "that bridles the wild Highlandman," dividing these two territorial sections by a natural line, has been, in fact, a determining factor in the development of the Scottish nation. To the north and the south of the Forth respectively there have existed to the present day two distinct peoples, speaking different languages and possessing different characteristics, partly the result of original racial idiosyncrasies and partly the result of their respective histories. The mutual relations between these two peoples, it will be seen, have been of the first importance in the history of the Scottish nation.

In the first quarter of the 11th century the entire mainland of Scotland was nominally consolidated under one ruler, Malcolm II, who came of the Celtic race beyond the Forth. Though territorially consolidated, however, there was little cohesion between the northern and southern sections of the kingdom, and the process in the next stage of national development (1100–1300) was the knitting of the bonds between the different peoples and their gradual subjection to an acknowledged head. In this process, also, there were general causes at work which were common to Christendom, and causes which were peculiar to Scotland herself. The general causes were the introduction of the feudal system, the organization of the Church with Rome as its centre, and the growth of towns and municipal institutions — all the result of the general movement among the countries of Western Europe. Peculiar to Scotland itself during this period of her development was the decisive supremacy obtained by the Teutonic over the Celtic peoples in the direction of the national destinies. The marriage (1068–93) of Malcolm Canmore, a Celtic prince, with the Saxon Margaret marks the beginning of the struggle between the two races which was to decide whether there was to be the Scotland which exists to-day. From that marriage issued a line of kings with Teutonic names, Teutonic sympathies, and with the abiding purpose of Teutonizing the national institutions. The reasons for this policy are sufficiently obvious. The country between the Firth of Forth and the Tweed, which had been acquired through conquest by the Celtic kings of the north, and whose inhabitants were mainly Teutonic, was the most valuable part of their kingdom, and naturally tended to become its political centre. From the death of Malcolm Canmore in 1093 to the death of Alexander III in 1286, therefore, the task of the successive Scottish kings was, on the one hand, to defend the southern part of their dominions against the encroachments of England, and, on the other, to hold in check their Celtic subjects to the north of the Forth and in the extensive district of Galloway (also mainly Celtic) in the southwest. By the death of Alexander the task had been accomplished, and Scotland was now a consolidated kingdom, effectually ruled by one acknowledged prince, with Teutonic influences in the ascendant.

The Struggle for Independence.— The death of Alexander III's only heir, Margaret of Norway, led to the attempt of Edward I of England and his immediate successors to attach Scotland to the English Crown, and for more than half a century she had to fight for her bare existence as a nation. The results of the struggle were of the highest importance for the future of her people. Successfully maintaining her independence, by the very effort she made for self-preservation she became a united nation with a consciousness of a distinct destiny which had not been present to her even in the "golden days" of Alexander III. By the ordeal they had passed through, moreover, the Teutonic section of her people, who had been mainly interested in the issue of the struggle, acquired that national characteristic "the carl o' hemp in man"— that dogged persistence, which the world has recognized as a peculiarity of the typical Lowland Scot. But, as we shall see, there was another result of the struggle for independence which, if it did not affect the national character, powerfully influenced Scotland's laws and institutions, political, social and municipal. In the contest with England she had sought the alliance of France, and for two centuries and a half she was in closer contact with France than with England. Previous to the War of Independence it was from England she had borrowed what she needed; now it was to France that she looked as her model.

The Development of National Institutions Under French Influence, 1472–1542.— From the death of David II in 1472 to the beginning of the reign of Mary in 1542 is a well-marked period of Scottish history, during which the national institutions assumed the general form which they maintained till the union of the Scottish and English Parliaments in 1707. Throughout this entire period the dread of English aggression was still the constant preoccupation of the people, and this permanent dread at once deepened the national traits of hardihood and caution and contributed to the strengthening of national sentiment. In the development of institutions we have again to note the action of causes common to western Europe. Like the kings of other countries the kings of Scots deliberately aimed at crushing the power of the feudal nobles and establishing a central authority over which they should be supreme. But in this endeavor they were checked by two hostile forces — the power of the Scottish nobles themselves and the insubordination of their Celtic subjects in the Highlands and the Western Islands. As the result of these opposing forces, whose relative strength was constantly changing, a Parliament like that of England, with well-defined privileges and efficaciously representing the different classes of the people, could not come to birth in Scotland. In the Scottish Parliament or Estates (so-called in imitation of the French *Etats*), the Lords

Temporal and Spiritual, the Commissioners for the Shires and Burghs, sat in one House and nominally legislated for the nation, but the actual power of the Parliament was in the hands of a committee known as "The Lords of the Articles," the choice of which lay with the king or the greater barons according as the one or the other was in the ascendant. Till the Scottish Parliament ceased to exist, therefore, it was but the convenient instrument of whatever authority chanced to preponderate in the State. In the case of other institutions it was from France that Scotland borrowed the models she sought to imitate. It was from France, mainly during the period of which we are speaking, that she took over the Roman law, thus departing from the example of England; and the College of Justice (the present Court of Session), established by James V in 1532, was formed on the pattern of the *Parlement* of Paris. In the election of municipal bodies in the burghs the method of France was likewise adopted (the retiring body electing its successor), a method which prevailed till as late as the 18th century. From France, also, during the same period was taken the arrangement of feu-farm by which land was leased in perpetuity — an arrangement encouraged by the Estates and intended (ineffectually as it proved) to remedy the system of short and precarious leases which till the 19th century disastrously affected agriculture in Scotland. When to these borrowings we add the fact that the majority of highly educated Scots studied in the schools of France, it will be seen that, apart from the political results of the alliance, the influence of France in Scotland is one of the important facts in the national development.

From the Reformation to the Revolution, 1542–1689; Adoption of Protestantism and Alienation from France.— With the beginning of the reign of Mary (1542) Scotland makes a new departure and enters on a period which definitely closes with the Revolution of 1689. The dominating fact of the period was the adoption of Protestantism in place of Catholicism as the national religion (1560). The immediate result of the change of religion was alienation from France as a Catholic country and approach to England, with an ever-growing conviction on the part of both peoples that political union was in the interests of both. But there were other results from the religious revolution which permanently affected the national character and the future of the country. For the first time in the nation's history an issue was presented which the public mind was mature enough to comprehend and which was of a nature to evoke the inherent contrarieties of thought and feeling which divide man from man. From the change of religion and the political consequences it involved there resulted a collision between two types of mind which have been in antagonism ever since. But this very collision of opposites produced a quickening of the general consciousness which made Scotland a nation in the strictest sense of the word. From the Reformation to the Revolution the country was cleft in twain by two opposing principles and two opposing parties, between which compromise was impossible and political equilibrium was unattainable. On the one side were the successive Stewart kings who aimed at absolute control in Church and State, and on the other, the religious party which adopted Presbyterianism as its form of church polity and which maintained the Church's independence of the State. After a struggle that had lasted above a century came the Revolution of 1689, when England and Scotland both cast out the House of Stewart and a new order began.

From the Revolution in 1689 up to the Present Time; the Union of Scottish and English Parliaments (1707); The Jacobite Risings; Subsequent Privileges; Modern Development.— For Scotland as for England the Revolution marks the beginning of the modern time. Throughout the foregoing period theological considerations had dominated the public mind equally in affairs of Church and State; henceforward secular interests become more and more the impelling motives that determine the action at once of the State and of the individual. The immediate result of this changed attitude was the union of the England and Scottish Parliaments in 1707. In the previous century ecclesiastical differences had been a bar to this union; now considerations of reciprocal interests determined both nations to accept it. For Scotland the union was a necessity if she was to take her place among the nations. Hitherto she had labored under disadvantages which, in spite of the strenuous efforts of her people, had impeded her free development. Her remote situation, her limited area of arable soil, her long antagonism to England, her political and religious distractions, and, as the result of all these concurrent disadvantages, the meagreness of capital, had crippled her in all her efforts to develop her resources and to compete with more fortunate nations. The immediate consequences of the union, however, did not give promise of the future that was in store for her. The old jealousies between the two partners increased rather than abated, and for fully half a century Scotland sullenly acquiesced in a union into which (such was the feeling generally expressed) she had been entrapped by unscrupulous statesmen, and from which she had only received insult and injury. The Jacobite risings of 1715 and 1745 are the significant commentary on the state of feeling even in the Lowlands, but, as the issue of both enterprises proved, the heart of the nation was too deeply committed to the new order to revert to a régime that would have been inherently opposed to the spirit of the new time.

By the middle of the 18th century the advantages that accrued from the union were no longer doubtful, and henceforward the industrial and commercial progress of the country exceeded the expectations of its most sanguine advocates. Manufactures multiplied; the mineral wealth of the country and the riches of its seas were utilized for the first time on an extensive scale. Foreign trade had hitherto been almost entirely restricted to the exchange of commodities with the countries bordering on the German Ocean and the Baltic Sea, but by the opening up of trade with America, Glasgow, Greenock, and Paisley — mere villages at the time of the union — grew into great towns and important commercial centres. Hitherto, also, the three types of burghs, peculiar to Scotland — Burghs of

Barony, Burghs of Regality, and Royal Burghs — only the last had enjoyed the privilege of foreign trade in staple commodities, but this privilege gradually fell into abeyance, and every burgh with sufficient enterprise was at liberty to compete with its neighbors. In connection with the burghs a further progress has to be noted. In Scotland, as in other countries during the Middle Ages, trade and commerce had been shackled by conditions, necessary at the time but which were incompatible with free national development. Only Royal Burghs had possessed the privilege of being the homes of the great industrial crafts; in all the three types of burghs only burgesses had the right of pursuing any form of trade; jealous rivalry prevented free commercial intercourse between the different towns of the kingdom; and, finally, the fixing of the prices of commodities by the town councils or by the state obstructed the natural competition which is the life of trade. Later than in England, though not later than in France and Germany, these restrictions gradually ceased to be operative, and in 1846 «exclusive privileges» in trade and commerce were formally abolished by an Act of Parliament.

Thus by the awakened spirit of her people and the surprising development of her resources, Scotland, for long a thorn in the side of her more powerful neighbor, came to be England's valuable ally in the building up of empire. To the growth of the British colonies it is admitted that she has contributed even more than her relative share: the number of pioneers whom she has sent to New Zealand, to Australia and Canada is relatively greater than has proceeded from England, and equally out of proportion is the number of rulers and soldiers she has given to India and the other dependencies. In science, philosophy and literature it is sufficient to recall the names of Watt, Adam Smith, Hume, Burns, Scott and Carlyle, to prove that she has contributed her own quota to the common stock of material and spiritual wellbeing.

In the rapid development of the country the Lowlands of the south and east were the principal agents, but the Highlands also were powerfully affected by the transformation of the rest of the kingdom. The risings of 1715 and 1745 may be regarded as the last efforts of the Celtic population of Scotland against the Teutonic element, to which it had been in permanent antagonism since the time of Malcolm Canmore. Through the action of the government after the last attempts of the Stewarts to recover their heritage the Highlands ceased to be a source of danger, but became a source of economic perplexity. The social conditions under which the Highlanders had hitherto lived now came to an end: the time-honored raids into the Lowlands were no longer possible, and the Highland chieftain ceased to be a feudal lord and became a proprietor interested in the produce of his land. Thus arose the problem, even yet imperfectly solved, how under their conditions of climate and surface and soil the Highlands might be made a tolerable abode for their populations and a partaker in the general prosperity of the country. But, though in the past debarred by physical conditions from playing a main part in the material development of the country as a whole, the Highlander is yet a constituent element of the Scottish nation. The nature of his home, the romance that has come to surround his character and his history are valuable assets among the national possessions. The natural complements the one of the other, the Lowland Scot supplies the cautious persistency, the sure hold of the fact indispensable in the conditions of modern life, while his Highland fellow-countryman by his quicker emotions and his natural grace is a standing reminder that there are other ideals than those of mere material prosperity.

Religion and Education.— We have seen that during the 16th and 17th centuries public affairs in Scotland were dominated by ecclesiastical considerations, and that at the Revolution of 1689 this domination came to an end, and material interests came more and more to occupy the public mind. Nevertheless, though religion thus ceased to be the determining factor in the national policy, it still remained a subject of absorbing public interest to the community at large, and throughout the 18th and 19th centuries religious controversy fills a large place in the national history. As a result of the Revolution, Episcopalianism, which had been made the national church by Charles II at his restoration in 1660, and which clung to the House of Stuart as its founder and patron, was disestablished in 1689, and Presbyterianism put in its place (1690), was bound by its own interests to support the Revolution régime. The National Church thus established remains till the present day, but in the course of the last two centuries there have been frequent secessions, resulting in the formation of various religious bodies of more or less importance. By the restoration of lay patronage in 1712 a division of opinion was created which led to the first Secession under Ebenezer Erskine, whose members are known as the «Associate Presbytery,» or popularly as «Seceders.» Among the Seceders themselves there soon arose a division regarding the oath of allegiance enacted from the Scottish burghs, from which sprang the two bodies, respectively denominated Burghers and Anti-burghers. In 1761 came another Secession from the Established Church, also occasioned by difficulties connected with patronage — the new Secession taking the name of the «Presbytery of Relief.» In 1820 the Burghers and Anti-burghers united under the designation of the «Associate Synod of the Secession Church,» and in 1847 this body joined that of the Relief, to form the «United Presbyterian Church.» In 1843, one of the memorable years in Scottish Ecclesiastical history, the national church suffered its greatest disaster since the Revolution. Once more on the question of patronage, as involving the question of spiritual independence — the right of a church to independence of the state in all matters touching purity of doctrine — a numerous body of its ministers, led by Dr. Chalmers, effected the «Disruption» and set up what was known as the «Free Church of Scotland.» Finally, in 1900, the Free Church and the United Presbyterian Church united under the name of the «United Free Church of Scotland.» In this union, however, a minority of the Free Church refused to concur, and a judgment of the House of Lords (1904) decided that the property of the church belonged to the minority — a decision which occasioned an Act of Parliament appointing a commission to allocate the property between the two sections.

Thus at the present time in Scotland there are two main bodies of the Presbyterian Church: the Established Church and the United Free Church. The Scottish Episcopal Church and the Roman Catholic Church, the latter mainly consisting of persons of Irish extraction, are the two other chief religious denominations. In the recent history of Scottish elementary education the most memorable event is the Education Act of 1872, by which Board Schools were substituted for the old Parish Schools and education was made compulsory from the age of 5 to 14. In 1889 elementary education was made free. While Scotland has always compared favorably with other countries in elementary education, her provision for secondary education remains defective, though government grants for that purpose have wrought much improvement in recent years. Within the last half century the universities of Scotland have undergone reforms which have changed their original character and were intended to adapt them to modern needs. By the University (Scotland) Act of 1858 they received a common constitution, and by the Universities Act of 1889 this common constitution was further reformed. The supreme body in each case is a University Court; there is also a Senatus, consisting of principal and professors, who regulate internal administration. There are four universities — Edinburgh, Glasgow, Aberdeen and Saint Andrew's, to which last the University College of Dundee is affiliated.

Law and Justice.— The law of Scotland was originally based on Roman law, but there has been a gradual assimilation between the law of Scotland and that of England. This has been specially the case with mercantile law, which is now mainly identical in both countries. The system of real property law, however, is fundamentally different from that of England. In England the fee simple can be split up into estates for life, while fee simple in Scotland cannot be split up; and what is called a liferent is merely a burden on the fee. Estates in remainder are unknown; the fee is destined to institutes and substitutes, and the word entail means in Scotland only a destination that cannot be broken except under defined conditions. In Scotland, in the law of contracts no consideration is necessary to make a contract actionable. In Scotland, law and equity have never been separated, but have always formed a single system. The law of personal and domestic relations, being largely founded on Roman law, differs in its broad principles from that of England. The tendency, however, has been to assimilate the two in the course of modern legislative changes. Marriage, for example, need not in Scotland be celebrated *in facie ecclesiae,* but can be constituted by mere informal contract of the parties. Marriages can also be more readily dissolved — desertion being sufficient ground of itself. The administration of the civil law is vested in the Court of Session subject to appeal to the House of Lords. This tribunal consists of an Inner or Appellate House, which sits in two Divisions, one of which is presided over by the Lord President and the other by the Lord Justice Clerk. There is also an Outer House, consisting of five Judges of First Instance who sit singly under the title of Lords Ordinary. There are also in each county local courts with restricted jurisdiction, presided over by sheriffs or sheriff-substitutes, which in many respects correspond to the County Courts in England, but have a somewhat wider jurisdiction. The criminal law is administered by the same body of judges sitting on the criminal side and with a somewhat different organization. In his capacity as Head of the High Court of Justiciary, the Lord President is Lord Justice-General of Scotland. There are also Magistrates' Courts, burgh and county, which exercise police jurisdiction. These magistrates are for the most part unpaid laymen.

For geography, geology, hydrography, population, education, political constitution, etc., see SCOTLAND, and SCOTLAND, LANGUAGE AND LITERATURE OF. See also other articles in this section.

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18. IRISH HISTORY. Ireland, lying to the west of Great Britain, forms one kingdom with it, which is known as the United Kingdom of Great Britain and Ireland. This designation was introduced in the year 1800, when the Act of Union which united the Parliament of Ireland with that of Great Britain was passed. So far as political institutions can avail, Ireland is one with the neighboring country. But in spite of the political tie she stands widely divided from Great Britain by most of the characteristics which are distinctive of a nation — historical traditions, racial spirit, social and economic conditions. The distinction is marked even in the physical character of the island. Possessing little mineral wealth — iron ores in Antrim and Leitrim and some coal deposits in Antrim, Leitrim and Kilkenny — Ireland has not within itself the resources of a manufacturing country. The great central plain, stretching across the island from sea to sea, richly covered with vegetation, is adapted to pastoral and agricultural industries only, while the hilly regions to the north and south offer a soil that only tillage can make fruitful. Though water is abundant, water-power is deficient, owing to the generally low level of the country, fully one-half of which does not rise to an elevation of 300 feet above the sea.

Ancient Legends.— From the earliest times to which tradition reaches back Ireland was occupied by off-shoots of that great Celtic race which spread from the Hellespont to the English Channel. Lying within easy reach of the coast of Gaul it was exposed to the incursions of the sea-faring Celts of northern Europe. According to the ancient legends it was successively overrun and conquered by five different invading tribes. The last of these were the Milesians. The legends represent these invaders as migrating from Spain about 700 B.C. and establishing their sovereignty over the whole of Ireland. Modern scholars incline to the view that the story of the Milesian invasion is the record in tradition of an invasion by British Celts which took place most probably about the beginning of the Christian Era. The political organization of the Irish Celts was strictly tribal. The land of the country was parceled out among a number of petty chiefs or heads of tribes, who owed certain duties of tribute and service to the more powerful over-kings; above these again was the ard righ or chief king whose authority was acknowledged in proportion to his power to make it effective. The tribal organization remained an enduring source of national weakness; it hindered the growth of an effective national power; it prevented any effective combination of the national forces against foreign invasion.

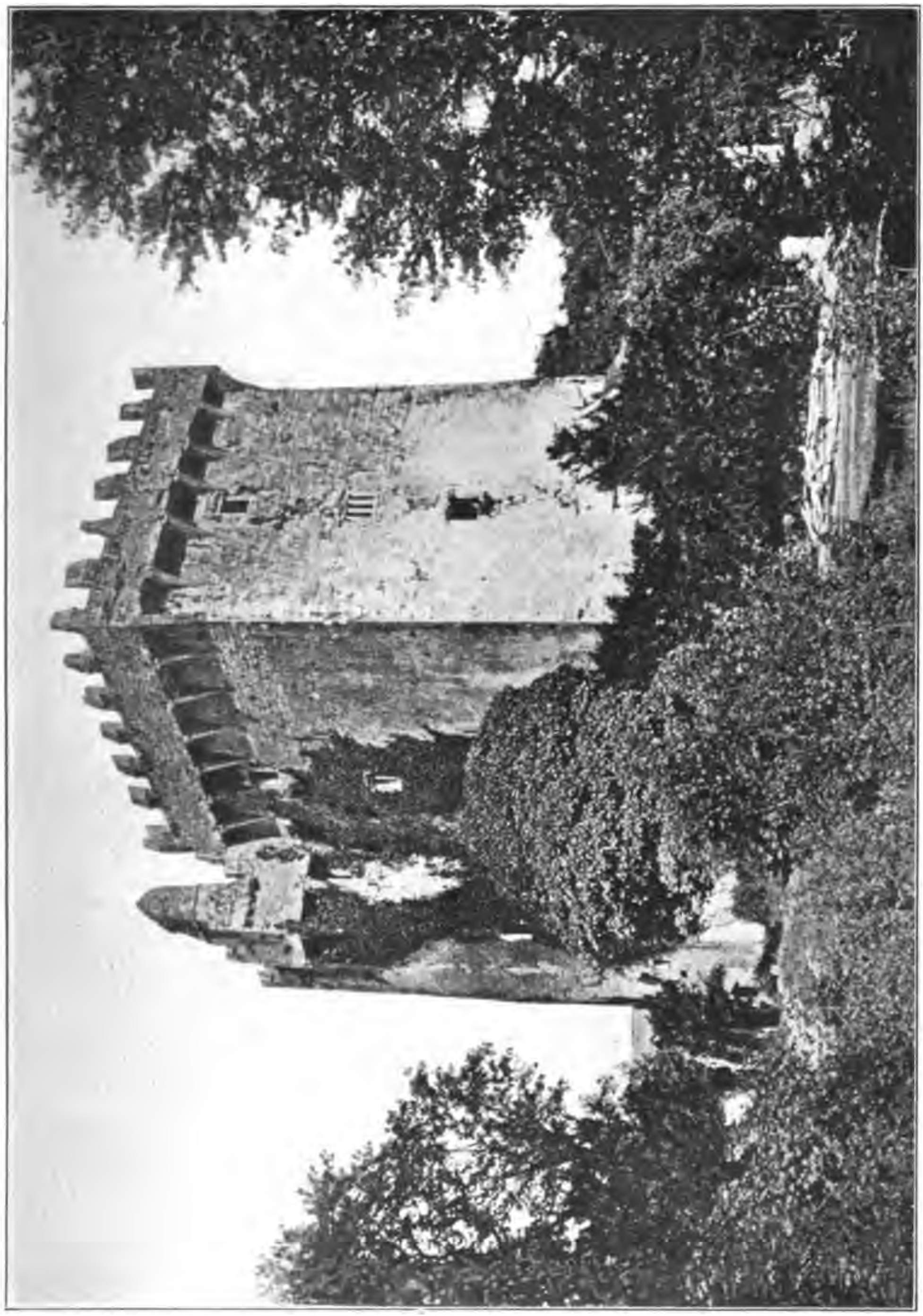
Christianity Established.— In the second half of the 5th century Ireland was converted to Christianity; its conversion was the work of a few years. That the new faith was accepted readily may be due to the fact that the previous religion of the people — if it can be called a religion — was ill-defined and unsystematized; a definite belief with a definite system of worship would not have been surrendered without a struggle. Saint Patrick and the other founders of the Irish Church accommodated themselves to the political organization of the country. Monastic institutions, established on lands granted by the converted chieftains, became the centres of church government, their jurisdiction being coterminous with the territory on which they were founded. They seem to have been regarded as identified with the local civil organization and were freely plundered and destroyed in the raids which, in the absence of a controlling central power, the petty rulers made on one another. This notwithstanding, monasticism exhibited remarkable developments in Ireland. For three centuries after the death of Saint Patrick the Irish monastic schools were the centres of learning in Europe. Scholars flocked to them from Great Britain and the continent;

and from these schools went forth the teachers who carried faith and knowledge among the Teutonic conquerors of the Roman empire. This missionary activity declined with the growth of civilized institutions in the new kingdoms that had been formed out of Rome's possessions. The source of supply was moreover sadly disturbed in Ireland. (See MONACHISM). At the beginning of the 9th century the Northmen, at the same time that they began their raids on England, extended their incursions to Ireland. They succeeded in establishing a few important strongholds on the coast and carried fire and sword through a country whose warring rulers met them as enemies or received them as allies according to the needs of their struggles with native rivals. The monasteries were a special object of hate to the Vikings; when their power was at length broken, in the 11th century, Irish monasticism was found to have run its course, and the field lay open to the Latin or Benedictine monasticism which was to succeed it.

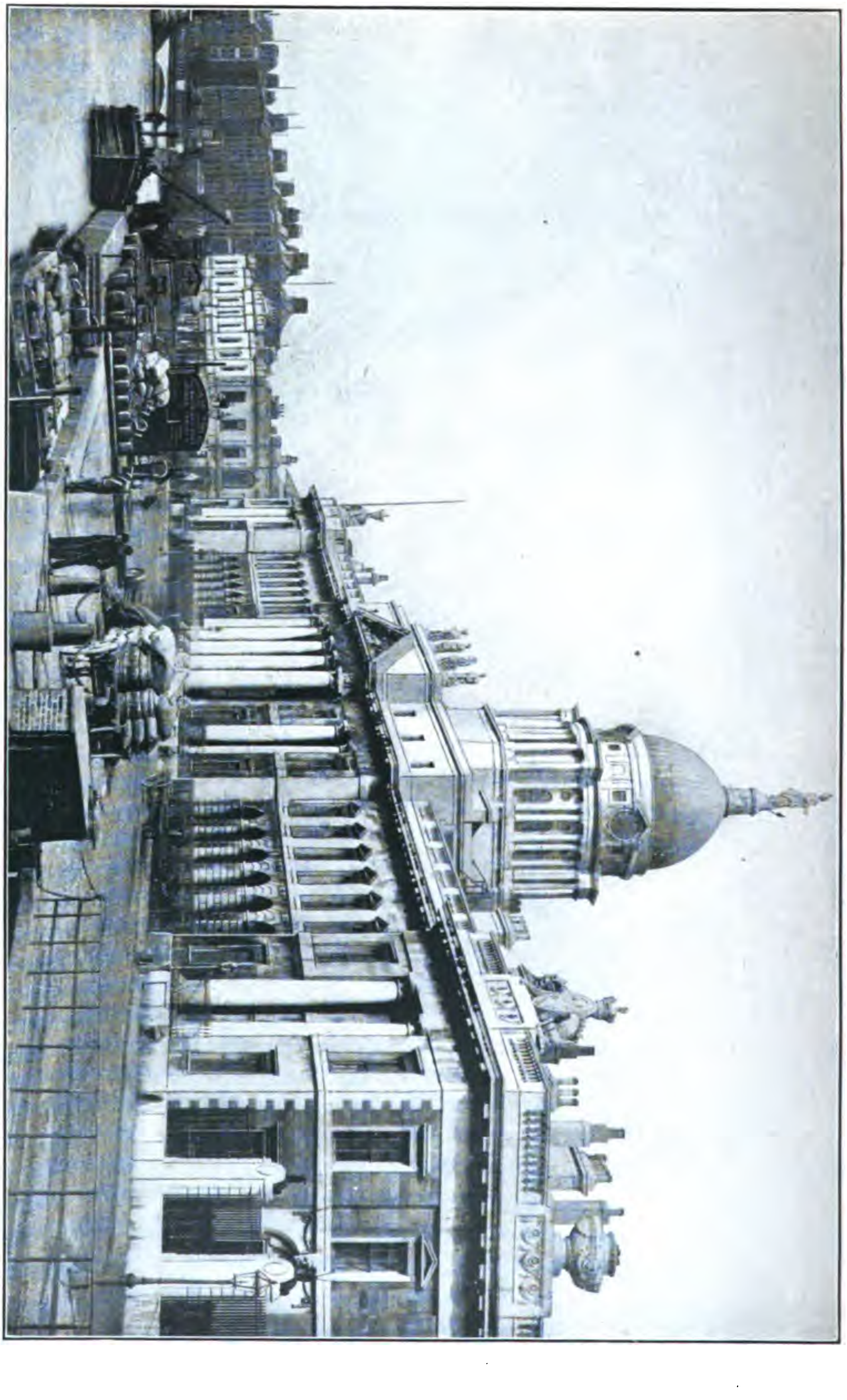
Establishment of English Power.— With the 12th century opens that long chapter of Irish history which records the relations of Ireland to England. The history of those relations is the history of Ireland to the present day. In 1169 the first body of Anglo-Norman adventurers crossed the Irish Sea, the precursors of many a subsequent expedition. They came as the allies of a native chief who had been expelled from his territory. They came to stay, and after them came, in long succession, other bodies of adventurers. It was thus the foundations of English power in Ireland were laid. It was a fitful and tedious process, carried out for four centuries without any definite plan, and at no time during that period with forces sufficient to effect a general conquest. On the other hand the native Irish, owing to their tribal organization and to the absence of an effective central authority among them, were never able to unite for common defense against the invaders. The growth of a national spirit and a national life was rendered impossible. Politically there were two Irelands within the island — one, that portion of the country in which English law prevailed, and the authority of the English Lord Deputy was recognized, and which came to be called the Pale; and, outside this, another, ruled by Irish chieftains, or by Anglo-Norman lords who adopted Irish customs and who obeyed or resisted the authority of the Crown as suited their interests. Parliamentary institutions were introduced into Ireland soon after their establishment in England. But, as they were for the English settlers only, and were set in motion chiefly to provide subsidies for the English monarch, and as representation was bestowed much as the Lord Deputy chose to distribute it, the occasional summoning of a Parliament did little to promote the evolution of a national government. With the reign of Henry VIII came the Reformation (q.v.), and, with this, the introduction of a new element of discord into Ireland. Racial and political feuds were now intensified and embittered by religious antagonism. Throughout the desolating wars of Elizabeth's reign, the «Plantations» of James I, and the sanguinary campaign of Cromwell (q.v.) the policy of at once destroying the «Irish Enemie,» and extirpating popery, was consistently pursued. The defeat of the Irish at the Boyne (1690) made the English interest in Ireland definitively safe from armed attack. The English power was now supreme and it might have been anticipated that the country would enter on a career of economic and political development. But this was not to be for some time yet. Religious hate divided the country as effectually as animosities of race. A penal code was passed against the Catholic religion which demoralized alike those who administered it and those whom it oppressed. Mr. Lecky describes it as «ingeniously contrived to injure, to insult, and to impoverish the people of Ireland.» It is evident there could be no development of political organization in a country four-fifths of whose inhabitants were by law excluded from Parliament, from the magistracy and from the bar, could not vote at elections, could not act as constables, sheriffs or jurymen, were debarred from every means of educating their children, from acting as schoolmasters, ushers or private tutors, could not marry Protestants or purchase «manors, tenements, hereditaments or life annuities.» (Lecky).

English Repression, Subsequent Poverty and Passage of Land Acts.—A vigorous national spirit is the best cure for the excesses of religious intolerance, and through the 18th century there were causes at work which tended to create and develop this spirit. The English government, under pressure from English agriculturists and manufacturers, had, since the Restoration (1660), hampered by restrictive legislation every Irish industry which seemed likely to compete with England in the home or foreign market. This policy of stifling or starving industry affected Irish Protestants and Catholics alike and roused in them the sense of common national interests. The ablest spokesmen of the dominant party began to demand free trade for Ireland, a free Parliament and emancipation for the Catholics. Free trade and a free Parliament were secured and some of the more galling disabilities of the Catholics were removed. A genuine national life began to animate the country and its progress during the period of its Parliamentary independence was unexampled. As Lord Clare put it, «No nation on the habitable globe had advanced in cultivation, commerce and manufacture, with the same rapidity as Ireland from 1782 to 1800.»

But in 1800 the Act of Union put an end to the Irish Parliament, checked the further growth of that prosperity which had been stimulated by distinctively Irish legislation and hindered the further development of that spirit of religious tolerance which the sense of common economic needs and interests was generating. Explain it as we may, England and Ireland will not, and apparently cannot, form one economic organism, in which one stream of industrial life will circulate. The long series of repressive acts directed against Irish industries is proof of this for the centuries that are past. For our own time, the proof is furnished still more cogently. The 19th century was, for Great Britain, a period of unexampled prosperity. Her growth in wealth, in power, in population was continuous. She secured for herself the supremacy among the manufacturing and trading nations of the world, and from that eminence she has not yet been displaced. But while Great Britain was thus rising to unexampled industrial greatness, the remaining portion of «the United Kingdom»



Blarney Castle, Ireland



Custom House, Dublin, Ireland

was declining in wealth and population with a rapidity which has no modern parallel. Thirty years after the Irish Parliament had been abolished, the industries which had flourished under its care had almost disappeared. The people of Ireland were, in consequence, thrown wholly upon the land. Competition for the one available means of livelihood became excessive, holdings were divided and subdivided, and rents rose far above the economic level. The population grew, but the means of subsistence did not increase proportionately. The peasantry subsisted mainly on the potato crop; in 1846 this crop failed and famine followed. The repeal of the Corn Laws and the competition of foreign countries brought down the prices of agricultural produce. High rents could no longer be paid by small tillage farmers. The only farm industry as yet safe from foreign competition was that of cattle raising — the means of rapid transport from the United States, the Argentine Republic and Australia had not yet been perfected — and to make room for large grazing farms the small cultivators were ruthlessly cleared off the land. With the famine and the clearances began a movement of emigration which has reduced the population by nearly one-half. But in time the grazing ranches of the United States and the Argentine, and the sheep farms of Australia were brought within reach of the English markets, and prices fell so far that the graziers could no longer pay the high rents. An agrarian revolution was the consequence. The government intervened, first to fix farm rents on the basis of current prices, and, when this was found unsatisfactory, to mediate for the sale of the land to the occupiers with the aid of state credit.

A series of Land Purchase Acts was passed, and the transfer of the land to the tenants is now proceeding on a large scale.

Remedial Legislation Passed by English Parliament.— It must be said that the English government has done much during the last half century to repair the injustices of the centuries preceding. Let us reckon briefly what has been done. Passing over Catholic Emancipation (1829) and the establishment of the system of primary education known as the "National" system (1831), both of which measures belong to the first half of the century, we have to put to the account of the English Parliament and government the Disestablishment of the Irish Church (1869), which gave equality to all religions before the law; the system of intermediate education (1878); the Royal University (1879), defective inasmuch as it did not *give* university education, but merely tested it and conferred degrees; local government (1898), which bestows on elected bodies the administration of local affairs; the series of Land Acts designed to improve the position of the occupier — the Act of 1870, which put a check on arbitrary eviction and gave the tenant compensation for disturbance; the Act of 1881, which established a tribunal to which the tenant could appeal for the fixing of a fair rent; the Act of 1885, which made the first advance (£5,000,000) to the tenants for the purchase of their holdings; the Act of 1888, which made another advance of £5,000,000; the Act of 1891, which advanced £33,000,000 for the same purpose; the Act of 1896, which amended the preceding acts; and, finally, the Wyndham Act of 1903, which facilitated the operations of purchase and increased the loan for buying out the landlords to £100,000,000, and the Land Act of 1909, providing further facilities for payment.

Previous to the passing of the 1903 measure a Department of Agriculture and Technical Instruction was established (1898) to instruct the people in the improved modern methods of agriculture and to diffuse among them a knowledge of the industrial arts.

Under these acts the operations of purchase have been carried out on a large scale. Up to 1902, under the earlier acts, over 70,000 tenants had purchased their holdings at sums amounting in the aggregate to over £20,000,000. In January 1906 the sales under the Wyndham Act had amounted to £7,207,548. Up to March 1917 the total amount advanced was £98,531,611, while £1,677,073 had been paid in cash by purchasers of estates. For the purposes of the Labourer Acts, 1906, 1911 and 1914 the Land Commission had advanced £4,586,821. The total number of holdings in 1917 was 572,045.

Prospects.—With all this remedial legislation the prospects of Irish industry are improving. The manufactures are confined chiefly to the northeastern corner of the island, where the shipbuilding industry of Belfast and the linen industry in the city and surrounding country employ a large number of hands. If we except the brewing industry in Dublin we may say that the rest of the country is devoted to farming. The farming is not of the intensive kind; of the 20,371,124 acres which form the area of Ireland close on 15,000,000 acres are devoted to permanent pasture and meadow, and thus, as has been said, "Two-thirds of the country is never touched by plough or spade." Under these conditions a large population cannot be maintained in comfort. Hence the ceaseless flow of emigration, chiefly to the United States and Canada. In 1841 the population was 8,175,124; in 1901 it was 4,458,775; in 1911, 4,390,219, and the drain still continues. The cost of the administration of justice is nearly double what it is in England, where the population is more than six times that of Ireland; and 10 times what it is in Scotland, where the population is about equal that of Ireland. Of the 103 members sent by Ireland to the Imperial Parliament over 80 are sent there to offer persistent resistance to the English government of Ireland. On the whole it must be admitted that under this government Ireland has not enjoyed the good fortune which the framers of the Act of Union promised her. Nor has Great Britain derived from the union the advantages which the authors of the measure anticipated. The predictions of Grattan and the other far-seeing opponents of the act have found melancholy fulfilment, and English statesmen of the present day seem warranted by the experience of a century in reverting to the policy — to which they are now committed — of trusting to self-government as the best means of securing material prosperity for Ireland and political harmony between the sister countries.

The Churches.— The principal religious denominations of Ireland are the Roman Catholic, the Episcopalian Protestant (late Church of Ireland, disestablished in 1869), the Presbyterian and the Methodist. The respective numbers of these communions, according to the census of 1911 are: Catholics, 3,242,670; Episcopalian Protestants, 576,611; Presbyterians, 440,525; Methodists, 62,382; and other professions, 68,031. The constitution and government of the Catholic, Presbyterian and Methodist bodies are the same in Ireland as in other countries. The constitution of the Protestant Episcopalian Church presents some points of special interest. The constitution of this church was framed under the Irish Church Act of 1869, by which the «Church of Ireland» was disestablished. The supreme authority is vested in the General Synod. The General Synod consists of two houses: the House of Bishops, which includes all members of the Protestant episcopacy, and the House of Representatives, consisting of 208 clerical and 416 lay members. These representatives are elected by the clerical and lay members of the Diocesan Synods, which, in their turn, are elected by the clergy and laity respectively of the several dioceses. The General Synod is the supreme authority in all matters relating to discipline and doctrine within the church. The funds of the church are held by a body of trustees called the Representative Body. The capital sums in the hands of this body amount, according to the most recent returns, to nearly £14,000,000 sterling. See English Nonconformity and English Roman Catholics.

Executive.— The supreme executive authority in Ireland is vested in the king's representative, the Lord Lieutenant, who enjoys the title of Lieutenant-general and General Governor of Ireland. He is appointed by the Crown, is a peer, and must be Protestant. Sometimes he has a seat in the Cabinet and takes an active part in the Government of the country; more frequently he is a mere figurehead, the real executive authority being held by the «Chief Secretary to the Lord Lieutenant.» The Chief Secretary is usually a Cabinet Minister, and is responsible to the House of Commons for the acts of the Government. The salary of the Lord Lieutenant is £20,000; that of the Chief Secretary, £4,425. When the Home Rule Act of 1914 is put into effect this system of administration will be subject to changes.

Local Administration.— By the Local Government (Ireland) Act, 1898, administrative functions in reference to highways, public health, and relief of the poor, were assigned to local bodies elected by the rate-payers — Borough Councils for the six largest towns; County Councils for the counties; and under these, Urban Councils for the smaller towns, and Rural District Councils for the country districts.

Judiciary.—At the head of the Irish judicial system is the High Court of Justice, with a Court of Appeal. The High Court includes two divisions — the Chancery and King's Bench Division. The work of these courts is done by a Lord Chancellor and 16 Judges, all appointed by the Crown. Cases of less importance are dealt with by the recorders of the cities, three in number, and 18 county court judges, who hold their sessions at various centres through the country. A numerous unpaid magistracy, assisted by «stipendary» or paid magistrates, deals with minor cases. The Criminal Justice Administration Act of 1914 provides for appeal in almost all cases.

Police.— The police force of the country is wholly under Government control. Dublin has a local police force, controlled by Government, consisting of 1,084 men at the end of 1916. The rest of the country is policed by the «Royal Irish Constabulary,» a semi-military force of 10,000 men. The Imperial Government provides about £1,500,000 per annum to maintain the police and constabulary.

For topography, hydrography, geology, flora, fauna, climate, population, agriculture, fisheries, manufactures, trade, commerce, transportation, finances, banking, etc., see Ireland, and also articles in this section: Agriculture; Mining; Land Laws; Fisheries; Industries; Factory Legislation; Trade Unionism; Commerce; Free Trade Movement; Banking; Railways; Shipping, etc. For government, education, religion, etc., see Ireland, and also articles in this section: Parliament; Crown and Cabinet; Political Parties; Civil Service; Judical System; Local Government; Church of England; Nonconformity; Roman Catholics; Judaism; Education; etc. For language and literature, art and architecture, and further details of history, see Ireland; Celtic Languages; and articles in this section: The Conquests; Mediæval England; The Reformation; English History of the 17th Century; Navigation Acts; The 18th Century; The 19th Century; etc. See also Irish Music; Irish Land Laws. For the 1916 revolution see under Ireland.

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19. WALES. Wales derives its name from a Teutonic root meaning foreign, applied to the country by the English invaders of Britain. In Welsh it is called *Cymru* (formerly spelled *Kymry*), a name, in spite of a superficial resemblance, entirely unconnected with the Cimbri or the Cimmerii. The Welsh term for a Welshman is *Cymro* (plur. *Cymry*), a derivative of the old Celtic *Combrox* (plur. *Combroges*), meaning a «fellow countryman.» This name is now thought to have been given by the Welsh and the northern remnants of the ancient Britons to themselves in post-Roman times in their joint struggles against the English. Before this they seem to have used for themselves the general term Britons (Lat. *Britanni*, *Brittŏnes*). For certain purposes, chiefly educational, Monmouthshire is now counted as part of Wales. In Roman times the chief tribes in Wales were the Ordovices in the north and centre, the Silures in the southeast and the Demetæ in southwest Wales. In the post-Roman period, and until the assimilation of the Welsh territorial system to that of England, the chief divisions were Gwynedd (in the northwest), Powys (in the centre and northeast), Gwent (in the southeast) and Dyfed (in the southwest), together with the contiguous parts of South Wales. This latter division in its totality was often called Deheubarth (*i.e.* the south part). These divisions practically survive in the dioceses of Bangor, Saint Asaph, Llandaff and Saint David's respectively. The country was anciently divided into cantrefydd (hundreds), and each cantref was usually divided into two cymydrau (commotes). Some of these cantrefydd (pl. of can[t] (*hundred*), and tref (*homestead*), such as Rhufoniog (Romaniacus), in Denbighshire, Dunoding, the land of Dunod (from Donatus), in Carnaryonshire and West Merioneth, bear Latin names, and must have clearly obtained these names during or after the Roman occupation. The division into county and borough divisions is due to the assimilation of the Welsh territorial system to that of England. The title «Prince of Wales,» derived from the ancient principality of Wales, is now conferred by the reigning sovereign on the heir-apparent. In recent times, the connection of this title with Wales has been emphasized by the acceptance of the office of Chancellor of the University of Wales by His Majesty King Edward VII, then Prince of Wales, and afterward by the present king. Wales has also recently received recognition of her national emblem of the Red Dragon as part of the armorial bearings of the Prince of Wales.

The Welsh people, though comprising subvarieties, form a distinct type among the peoples of the United Kingdom. The cause of this are largely physical and economic, acting from the remotest times, and on this basis the Welsh have developed a political, social and mental history of their own. The individuality of Wales is the more remarkable owing to her proximity to England and her exposure to English influences. The country stands, however, in the most obvious contrast to the central plain of England on which it borders, and its individuality has, to a great extent, a geographical basis. Wales consists almost entirely of a mass of mountains and uplands, intersected by various streams and rivers, the largest of which, the Dee, the Severn and the Wye, are on the east. In the lower valleys and the more level districts of the country, there are tracts of good land, but the upper valleys in the mountainous districts are subject to very heavy rainfalls, and are of little value for agriculture. There are also many large upland tracts, which can only be used for sheep-grazing. The population of rural Wales varies in density, but, owing to the smallness of the farms, it is often larger in proportion than in some of the agricultural districts of England. In the last century the distribution of the population of Wales underwent a great change by the discovery (especially in the south Wales coal-field) of great mineral wealth; and the consequent attraction of large masses of people into the industrial districts. These economic developments, too, have had a great effect on the social evolution of modern Wales.

Social Evolution and History.— The available evidence as to the prevalent type of the Welsh people shows that they are on the whole less fair, tall and bulky than the farmers of the English plains. They are, as a rule, more wiry and hardy than muscular, and a certain predominance of the nervous over the muscular system gives them, in certain districts especially, an air of keenness, sensitiveness and vivacity. The freshness of the air and the beauty and variety of the scenery also contribute to this end, as well as to an appreciation of linguistic aptness and poetic imagery. The excellent voices of Welshmen, too, are mainly due to the purity of the air. Brachy-cephalic types are rare, but mesocephalism prevails. Though the extreme blonde type is uncommon, there is a fair proportion of light or reddish hair, and in South Wales especially, a considerable admixture of pale-faced, black-haired and markedly dolicho-cephalic men, who look as if their type had been evolved in the shelter of the ancient forests of the country. Generally speaking, it may be stated that the prevalent types are the natural counterparts of the conditions of life of the Welsh farmer and his dependents, with its hard toil, careful calculation and plain fare.

The necessary interdependence of the members of the scattered communities of rural Wales has produced a certain sociability, fluency and aptitude for co-operation in public affairs, though in religious matters there is considerable cleavage. The chief religious denominations are the Calvinistic Methodists, the Independents and the Baptists. In purely Welsh districts crime is very rare. The conditions of Welsh agriculture from the remotest times, under necessities of soil and climate which often frustrated man's best hopes, have created a deep-rooted sense of man's dependence on powers that are beyond his control, and beneath the markedly religious spirit of the Welsh people there lies this fundamental instinct, the traditional intensity of which at times finds vivid expression. To this feeling are also linked a sense of the pathos of life, which has found utterance in Welsh poetry, a deep attachment to the soil, a minimizing of the importance of human distinctions in the face of the powers of nature, and a passion for a kind of natural justice, which has expressed itself in modern times mainly in a demand for religious equality and the disestablishment and disendowment of the State Church, and in the desire to correct by means of education the disabilities of birth and station.

The social evolution of the country has been largely conditioned by its geography. This is such that the economic value of land varies greatly. Until recent times, the stress of competition was almost entirely for the surface products of the soil. The discovery of mineral wealth, however, has now given the economic, social and political evolution new directions. In the hunting, pastoral, fishing and agricultural life of man in the Stone, Bronze and Iron Ages, right down to modern times, whether Wales was invaded by Iberian, Goidel, Brython, Belgian, Roman, Saxon or Norman, the motive of the struggle was essentially the same, namely, the possession of the good lands of the country, such as the river valleys and the flatter districts afforded. In Wales, the records of the ancient system of land tenure suggest that the weaker and stronger communities came to be interspersed, the better type of holdings being held by freemen in family groups, while the unfree villagers farmed their land mainly by a system of cotillage. The basis of social life was mainly tribal, and the necessary social adjustments produced a correlative body of custom and law.

The successive invasions of the country have left numerous archæological traces, as for example, the fortresses of unmortared stone of which Trerceiri in Carnarvonshire is an excellent instance. This fortress is now assigned by archæologists to about 100–50 B.C. The Romans developed the road communications and worked some of the lead mines of the country. After the departure of the Romans, the western coasts were harassed by invaders from Ireland, and Britons from the north appear to have been invited to assist in their expulsion. Some of these families, notably that of Cunedda Woledig, remained in Wales and became the founders of Welsh local dynasties. The struggles against the English and the Normans brought war into the foreground of Welsh life. The conquest of Wales by Edward I led to the establishment of a network of castles and garrison towns, governed by English law and custom, while the country districts remained Welsh. This led to constant friction, and the revolt of Owen Glyndwr (Glendower) was essentially a struggle of the country against the towns. The reign of Henry VII (a descendant of an Anglesea Welshman, Owen Tudor) was hailed with great enthusiasm in Wales, but it was this prince and his son Henry VIII who finally assimilated the Welsh legal system to that of England. Wales maintained its attachments to the Crown even through the Civil War, and until the second half of the 19th century was mainly conservative in politics.

The discovery of coal, slate, lead and other minerals, as well as the industrial and commercial revolution generally, has given the life of Wales a new aspect. In Glamorganshire, Monmouthshire, East Carmarthenshire, East Denbighshire and the slate districts of Carnarvonshire there are thriving and progressive industrial communities, with corresponding facilities for communication by land and sea. The rapid development in question is well exemplified in the case of Cardiff, (q.v.) which has grown in a few decades from being a moderate sized market town into one of the leading coal-ports of Britain. New docks, too, for Irish and Atlantic traffic have been built by the Great Western Railway at Goodwick in Pembrokeshire. There is in Wales a considerable seafaring population and in Montgomeryshire, Carmarthenshire and Merionethshire there are some woollen factories. The industrial districts of Wales and the large towns of England, as well as the United States and the colonies, have absorbed the superfluous population of the Welsh country districts, until depopulation has in several places been the result. The price of agricultural labor has gone up, and, owing to the greater possibility of finding employment elsewhere, there is a more independent attitude toward the governing classes in religion and politics. Local government has more and more fallen into the hands of Liberals and Nonconformists, and there are now no Welsh Conservatives in the House of Commons, but the landowners are mostly Conservatives. See LOCAL GOVERNMENT in this section.

Side by side with this development, there has grown up a desire for a measure of national self-government, especially in the sphere of education; and the first instalment of this was given in 1897 by the establishment of the Central Welsh Board for Intermediate Education, for the purpose of controlling the secondary schools founded under the Welsh Intermediate Education Act of 1889. These schools have made very rapid progress, and there are now about 120. The establishment of the University of Wales, federating the University College of Aberystwyth (founded in 1872), Bangor (1884), and Cardiff (1883) is a phase of the same movement. (See also BRITISH EDUCATION — WALES). Royal charters, too, have been granted for the foundation of a Welsh national museum at Cardiff and a Welsh national library at Aberystwyth. Several private collections of Welsh MSS. have been already bought for the latter. The great difficulty, however, in the way of complete national development and unification is the absence of a metropolis within easy reach of all parts. The most convenient meeting-place for the whole of Wales is Shrewsbury (the ancient Pengwern), which lies outside the Welsh border.

In addition to the foregoing factors of modern Welsh development, it should be stated that in the summer months there is a very great influx into Wales of visitors from England and elsewhere, in search of health and pleasure, and that for their accommodation whole towns have grown up along the coast. This link with England has helped to bring Wales more and more into closer touch with the outer world, while still living its own life and maintaining its individuality. Of the fine arts music and poetry are the only ones that have received extensive cultivation.

For topography, climate, etc., see WALES; for industries, commerce and trade see articles in this section on AGRICULTURE; MINING; FISHERIES; INDUSTRIES; COMMERCE; BANKING; RAILWAY; SHIPPING, etc.; for history, and further details on ethnology, language, literature, etc., see WALES; CELTS; CYMRY; CELTIC LANGUAGES; and in this section: THE CONQUESTS; MEDIÆVAL ENGLAND; ENGLISH HISTORY OF THE 17TH CENTURY; THE 18TH CENTURY; THE 19TH CENTURY, etc.

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20. NATIONAL FINANCE. National Debt.— The National Debt of the United Kingdom, in the sense in which the term is understood in several official returns, amounted on 31 March 1914 to £650,000,000, but in addition to this there were various amounts outstanding which had been borrowed for military, naval, and other works and brought the “Aggregate Gross Liabilities” up to £706,000,000. Further, a sum of £74,000,000 had been borrowed and lent to local authorities, and another sum of £95,000,000 had been borrowed for the purpose of establishing occupying land-ownership in Ireland by the expropriation of the former landlords. The total £875,000,000 nominally consisted of £539,000,000 of consolidated 2½ per cent stock (“consols”) redeemable at par at the option of the State only after April 1923, £47,000,000 of nearly similar stocks and permanent debt to the Banks of England and Ireland, £33,000,000 of treasury bills and exchequer bonds repayable at various dates, £86,000,000 of the capital value of terminable annuities including those raised for various works chiefly connected with the navy and the post-office, £74,000,000 of local loans 3 per cent stock and £95,000,000 of 2¾ per cent and 3 per cent Irish land stock. But most of the terminable annuities, about £86,000,000 of the consols, and about £91,000,000 of the other securities were not in the hands of the public but were held by the State itself against its liability to the savings bank depositors, so that it would give a truer account of the real position to say that the total debt consisted of about £640,000,000 in the securities just enumerated, and about £240,000,000 in money payable on demand or at very short notice to savings bank depositors.

The main body of the debt was chiefly due to the wars in which the country was engaged between 1688 and 1815. During that period the debt grew from nothing (except a trifling sum which Charles II had borrowed from the goldsmiths) to £900,000,000. It then underwent steady diminution till in 1899 it had fallen to £628,000,000. The South African war brought it up again to £771,000,000 in 1903, since which year it had once more been diminishing. The £56,000,000 of works debt had all been incurred since 1890, and most of it since 1900, when it only amounted to £10,000,000. The amount lent to local authorities was only £8,000,000 in 1840 and £26,000,000 in 1887. The Irish land debt took its rise in 1891, but most of it is much more recent.

The interest and sinking fund of the Irish land debt is naturally provided for chiefly by the payments made by the new Irish landowners, who are paying for their land by instalments, but a portion falls on funds which would otherwise benefit Irish local taxpayers and another portion is defrayed by the taxpayers of the United Kingdom. The local loans debt is adequately provided for by the interest and repayments received from the local authorities. The works debt is made a charge upon the annual parliamentary votes for the departments concerned, in such a way that each loan will be extinguished in 30 years at most. For the main body of the debt the practice has been since 1876 to devote by legislation a certain annual sum, called the “permanent” or “fixed” annual charge, to interest and repayment taken together. As the sum thus devoted considerably exceeds the interest, this plan, if carried out without modification and without interruption owing to fresh borrowing, would practically convert the whole debt into a terminable annuity and extinguish it in a very moderate length of time. But as a matter of fact the “fixed charge” was reduced from £28,000,000 to £26,000,000 in 1888 and by two steps to £23,000,000 in 1900, and it was only the fresh borrowings of the South African war which led to its restoration to £28,000,000 in 1905 from which it was reduced to £24,500,000 in 1910–11. The difference between the “fixed charge” and the interest is sometimes called the “New Sinking Fund.” The “Old Sinking Fund” is any actual surplus realized in the year. The general law is that this also must be devoted to repayment of debt, but when any considerable surplus happens to be realized, special legislation usually interferes with the operation of the rule. As stated above, the foregoing shows the development and position of the National Debt at 31 March 1914. By the same date in 1918, after 44 months of the European War, the gross debt was estimated at £5,850,000,000, of which sum about £1,600,000,000 represented advances made by Great Britain to her Allies and Dominions.

Expenditure.— The total expenditure on revenue account for the financial year 1913–14 is stated at £197,500,000. The total may be classified conveniently as follows: Fixed annual charge for the main body of the debt, £24,500,000; army, £28,000,000; navy, £49,000,000; old age pensions, sickness and unemployment insurance, £20,000,000; education, £28,000,000; miscellaneous, including the cost of collection of taxes, the administration of justice and the civil services not included under heads already enumerated, £22,000,000; post office, including telegraphs and telephones, £25,600,000; and amount handed over to local authorities, £10,000,000. The amount credited to education is chiefly made over to local school authorities, but only on conditions which give the central government a very large measure of control, not only over the expenditure of the money so granted, but also over what is raised from local sources. The £10,000,000 granted to local authorities, commonly called the «Exchequer Subsidies» or «grants in aid of rates,» consist of sums which are either fixed or vary with the yield of certain taxes and are not now directly connected with central control, with the exception that an amount equal to half the cost of the pay and clothing of a police force may be deducted from the grants due to an authority if it fails to maintain its police force to the satisfaction of inspectors employed by the central government. The method of distribution between the various authorities is extremely complicated and differs in England, Scotland and Ireland. Scarcely anyone professes to understand it and it is based on no sort of principle except that it is largely dependent on certain proportions which prevailed in 1888. This plan was adopted as a temporary expedient and has been continued not on account of its merits, but because it existed. These figures, again, refer to the last normal year before the war, an event which naturally influenced the whole domain of national finance.

Revenue.— The total revenue amounted to £198,000,000. The great heads were: Customs, £35,500,000; excise (internal duties on commodities), £39,600,000; estate duties (inheritance taxes), £27,400,000; income tax, £47,200,000; stamps, £10,000,000; house duty, £2,000,000; post office, including telegraph and telephones, £30,800,000; and miscellaneous revenue, £4,800,000. The duty on imports of tobacco brought in £18,300,000; tea, £6,500,000; sugar, £3,300,000; spirits, wine and beer, £4,500,000. The excise drew in one way and another over £37,000,000 from taxes on the manufacture or sale of beer and spirits, so that about £42,000,000, or 26 per cent of the whole tax-revenue, was derived from intoxicating liquors. The inheritance taxes, christened by Gladstone and now commonly called the «Death Duties,» consist of two distinct parts, one of which is graduated from one to fifteen per cent according to the aggregate value of the whole property left by the deceased; so that if a man dies worth £400, one per cent has to be paid and if he dies worth over £1,000,000, 15 per cent. The other part is graduated according to the relationship of the new owners of the property to the deceased, so that for example, while property bequeathed to descendants or ascendants is charged one per cent, property falling to brothers or nephews is charged 5 per cent and property falling to other persons is charged 10 per cent. Thus, taking the two parts together, if a man leaving £16,000 bequeaths it all to his children, 6 per cent only will be paid, while on a millionaire's property left to persons not related to him, the duties will together amount to 25 per cent. The Income Tax was levied at the standard rate of 1s. 2d. in the £ (i.e., 5.83 per cent), but incomes under £160 were exempt and certain graduated «abatements» were allowed on incomes between £160 and £700. Reduced rates were charged on «earned» income when the total income, earned and unearned, of the taxpayer, was not over £3,000, viz., 1s. in the £ when the total was between £2,000 and £3,000 and 9d. when it did not exceed £2,000. Much the greater portion of this tax is «collected at the source,» or at any rate before the income actually reaches the ultimate recipient. For example, the tax on the income arising from lands and buildings is collected from the occupier, who then, if he is not the owner, has an inalienable right to deduct the tax when paying his rent; so too the tax on the income from stocks, shares and bonds of corporations is collected from the corporation. But this practice does not defeat the right of the individual landowner or stockholder to exemption or abatement if his total income from all sources is under the prescribed limits; he makes up accounts with the collectors, declaring his whole income and showing how much has been deducted from its various parts and if it then appears that too much has been paid, the excess is repaid to him in cash. So far as the portion collected at the source is concerned, the tax works with great efficiency. The amount of evasion which takes place in regard to the other part, for which personal declarations of the amount of income are required, is very variously estimated, but there is little doubt that it is in process of diminution owing to the greater publicity of modern methods of business and to the checks supplied by the death-duties, which are administered by the same department. In 1909 a supplement to the Income Tax called the Supertax was introduced. It was a tax of 6d. in the £ (2½ per cent) on the amount by which an individual taxpayer's total income exceeded £3,000. It is not collected at the source but on the declaration of the taxpayer. The yield, about £3,300,000, is included in the £47,200,000 of income tax mentioned above. Stamps consist mainly of duties on commercial and speculative transactions. The House duty is levied at the rate of 9d. in the £ (3¾ per cent) of the rental value, but there are lower rates for houses of between £20 and £60 rental value, and houses under £20 in Great Britain and all houses in Ireland are exempt. The difference of £6,200,000 shown between the post office revenue and expenditures is almost entirely due to the mails, the telegraph and telephone business being unprofitable. In miscellaneous revenue the most important item is £1,250,000 from the Suez Canal Company's shares, which, it is well to remember, are a wasting property, the canal having been constructed on a 99-year concession.

War Finance, 1914–18.— Shortly after the beginning of the war Mr. D. Lloyd George, then Chancellor of the Exchequer, estimated the daily expenditure of Great Britain in the conflict at $3,750,000, which he said was a *diminishing* figure. For the financial year 1913–14 the total revenue stood at $991,215,000, and the expenditure was $987,463,500. Owing to the general financial panic prevailing in Europe during the pre-war international crisis, the London Stock Exchange was closed on 31 July 1914 by order of the government, and it remained closed till 4 Jan. 1915. On 2 Aug. 1914 a moratorium was proclaimed in Great Britain, which lasted till 4 December. On 6 August Parliament took the first vote of credit for war purposes — $500,000 000, and the second came on 16 November, for $1,125,000,000, when the Premier (Mr. Asquith) announced that $50,000,000 had been advanced to Belgium and $4,000,000 to Serbia. Between August and November (1914) Treasury Bills to the amount of

$450,000,000 were issued, and in the latter month the first great War Loan for $1,750,000,000 was issued in the form of stock at 95 per cent, redeemable in 1925–28, and bearing interest at 3½. The net yield was $1,615,000,000, which sum was intended to include the repayment of the Treasury Bills issued. The revenue rose rapidly. In 1914–15 it was $1,351,660,000, with expenditure of $5,568,270,000; in 1915–16 it was $1,684,000,000, with expenditure of $7,795,790,000. In 1916–17 the revenue rose to $2,667,140,000, and the expenditure to $10,990,565,000; in 1917–18 the revenue was estimated at $3,062,500,000 and the expenditure at $11,451,905,000. The highest point was reached in the Budget for 1918–19, which provided in round figures no less than $15,000,000,000, with estimated revenue of $4,200,000,000, leaving the balance of $10,800,000,000 to be covered by loans. The additions to revenue came chiefly from increases of the income and super tax, the customs and excise, from the new excess profits duty — beginning with 60 per cent on profit in excess of that obtained before the war, and the heavy "luxury taxes" imposed in 1918. The gradual rise in the war bill of Great Britain and the various votes of credit, loans, etc., by which the money was raised is shown in the following summary:

On 1 March 1915 a vote of credit for $185,000,000 was passed to cover expenditure to that date. The total voted since the beginning of the war to this date — eight months of war — amounted to $1,610,000,000, and represented the difference between the expenditure of the country on a peace footing and that on a war footing. The average cost of the war per day was now $7,500,000. On the same day (1 March) another vote of credit was passed for $1,250,000,000 to carry on the war for a period of somewhat more than three months. This was the largest vote of credit in the annals of the House of Commons. On 15 June 1915 a supplementary vote of credit (the 5th) for $1,250,000,000 was taken. The average daily expenditure had risen to $13,300,000, after standing at $7,500,000 for 240 days — in addition to the expenditure of the normal peace votes. On 20 July 1915 a supplementary vote of credit for $750,000,000 brought the total for the year up to $3,250,000,000, and a grand total of $5,560,000,000, since the outbreak of the war. On 15 Sept. 1915 a vote of credit for $1,250,000,000 was raised to cover expenditure to the middle of November. The daily cost of the war from 1 April to 30 June was given as $13,500,000; from 1 July to 17 July it stood at $15,000,000; and from 18 July to 11 Sept. 1915 it was over $17,500,000 per day. On 11 Nov. 1915, a fresh credit vote for $2,000,000,000 was taken, and two more on 21 Feb. 1916, one for $600,000,000 to cover the remainder of the financial year, and one for $1,500,000,000 to start the new financial year beginning on 1 April 1916. On this occasion the Premier stated that the total for votes of credit since August 1914 amounted to $10,400,000,000, with loans to Allies and dominions to date amounting to $844,500,000.

By 23 May 1916, when the 11th vote of credit for $1,500,000,000 was taken, the daily expenditure on the war had risen to $23,750,000. On 24 July 1916 the 12th vote, for $2,250,000,000, represented the largest sum ever asked for by any government in British financial history. This sum was to carry the war to the end of October, and on the 11th of that month another vote of $1,500,000,000 was designed to last till Christmas. A vote of $2,000,000,000 on 14 Dec. 1916 brought the total expenditure since the beginning of the war to $19,260,000,000, while the daily cost for the last 63 days had been $28,550,000. On 12 Feb. 1917 two votes of credit for $2,750,000,000 broke the "record" of the previous July; the daily expenditure had risen to $28,950,000; total since August 1914, $21,500,000,000; advances to Allies and the dominions, total, $4,450,000,000. On 15 March 1917 a vote for $300,000,000 was taken and the national expenditure reached about $30,000,000 per day. A vote for $2,500,000,000 on 9 May 1917 was estimated to pay war expenses to about the 1st of August; by this time British loans to her Allies and colonies attained to $10,000,000 daily. The greatest vote of all came on 24 July 1917, when $3,250,000,000 was asked for and granted, bringing the amount voted for 1917–18 to $7,500,000,000, and for the whole war to date, $27,460,000,000. Another $2,000,000,000 was voted on 30 Oct. 1917 and a further sum of $2,750,000,000 on 12 December. A government White Paper issued in May 1918 estimated the cost of the war to Great Britain at 31 March 1918 to be $63,750,000,000, of which sum $46,525,000,000 had been spent on the army, navy, air service and munitions and ordnance works, and that Treasury loans amounted to $8,750,000,000.

During 1918 further votes of credit were taken: $2,500,000,000 on 18 June, when the daily expenditure was stated to be $34,240,000, with debts due from Allies, $8,850,000,000 and from British dominions, $1,030,000,000; on 2 August a vote of $3,500,000,000 brought the total for the current year to $9,000,000,000. On 1 Aug. 1918, Russia owed Great Britain $2,940,000,000; France, $2,010,000,000; Italy, $1,565,000,000; Belgium, Greece and Serbia together, $595,000,000. At the end of July 1918, United States loans to Great Britain amounted to $3,345,000,000. The first British war loan has been mentioned above (November 1914); the second yielded $3,080,000,000; the third, of $5,000,000,000, was opened 2 Oct. 1917 and was to remain open till further notice. The loan reached the $5,000,000,000 mark on 15 Aug. 1918. The Chancellor of the Exchequer had decided to ask the country to lend the money as it was needed, at 100 million to 125 million dollars per week. For over 10 months money had flowed in steadily at an average weekly rate of $110,000,000. On 13 Nov. 1918, two days after the signing of the armistice, a vote of credit for $3,500,000,000 was taken, when the chancellor stated that Great Britain's debts abroad were not expected to exceed $5,000,000,000, and that the country could easily bear this if labor and capital worked harmoniously together.

Local Finance.— To give an absolutely accurate account of the finances of local authorities in the United Kingdom is impossible owing to the complicated relationship of the various local authorities to each other and to the central government, and also because the three kingdoms, England, Scotland and Ireland, have entirely different systems and methods of account-keeping. The aggregate debt in 1913–14, including of course the £74,000,000 of debt to the central government mentioned above, is stated (after deducting accumulated sinking funds) at about £655,000,000, but about £70,000,000 of this consists of the debt of harbor and dock trustees which is secured only on the harbors and docks, and in no way upon the taxes of any locality, and therefore ought not to be reckoned as local debt. The remainder represents capital invested in (taking the larger of the various items approximately in order of magnitude) waterworks, street and road improvements, schools, drainage, gasworks, tramways, electric works, workhouses, asylums and the innumerable other works and buildings required by modern civilized and especially urban communities. The aggregate annual repayments of debt and payments to sinking funds amount to a little over 2 per cent on the total, but the annual additions considerably exceed this amount, so that the debt increased nearly £300,000,000 in the first 13 years of this century. In this period however there have been two exceptional increases. In 1903 the capital of the London water companies was converted into debt of a board representing the various local authorities within the area of supply; this added about £46,000,000 without much altering the liabilities of the inhabitants or owners of the area concerned. In 1909 an addition of £23,200,000 was made by a similar conversion of dock companies' capital into stock of the Port of London Authority. About half the total capital has been raised for purposes which are often provided for by private enterprise, such as waterworks, gasworks, docks, electric works, tramways and cemeteries, and the other half for purposes which are seldom so provided for in modern communities.

The expenditure from revenue of the authorities, including repayment of debt, amounted in the year 1912–13 to about £170,000,000. About £26,000,000 of this was met by the allocated taxes and other national grants, chiefly for education, spoken of above, about £80,000,000 by «rates,» and the rest by the special charges levied for commodities and services supplied, and all kinds of miscellaneous revenue.

The «rates» are taxes levied by the local authorities at a rate of so many shillings or pence in the pound of the annual value of land and all things attached to the land in the concrete form of buildings or works of any kind. The idea of the Elizabethan rate for the relief of the poor undoubtedly was to assess inhabitants according to their ability, and down to 1840 attempts were frequently made to extend the system which long prevailed in some parts of the country of assessing stock in trade and other visible personal property. But experience showed that such taxation was utterly unsuitable for small localities, and when the law courts at last began to favor these attempts, legislation intervened. The tax is usually levied from the owner in the important case of small house property in England, but in almost all other cases from the occupier of the property. The occupier has no right of deducting rates paid from his rent unless he has so contracted with his landlord, and a contract of this kind is scarcely ever made. There is at present, under the Agricultural Rates Act, a rebate of 50 per cent in favor of agricultural land, and there are some other differentiations in the cities. The «rates» are elastic, certain, cheaply collected, and singularly free from disturbing effects upon production. The fact that they are unpopular is sufficiently accounted for by their enormous yield and their obvious character.

Financial Control.— The finance of the central government, according to the present theory of the British Constitution, is vested in the House of Commons. All financial legislation must originate there, and the Commons will not permit any alteration of their measures by the Lords. But in the House of Commons itself the power of initiation in matters of finance is now entirely in the hands of the Ministry. Estimates of expenses and receipts made up in the government departments are considered or amended by the Ministry in private. The result is then laid before the House of Commons by the Chancellor of the Exchequer in his «Budget Speech.» A ministry will rarely submit to modify its proposals in any important respect, so that the House has to choose between acceptance of the budget and a change of government. No ordinary member of the House can directly propose an increase in taxes or expenses, the theory being that it is the King who asks his faithful subjects for money, but anyone may propose reductions. The estimates are put before the House in immense detail, but this very detail defeats its own end, as there is not and cannot be, time to consider the whole to any good purpose. The estimates are consequently passed without material alteration. This absence of real control by the House of Commons is probably favorable rather than unfavorable to economy. The necessity of finding new taxes or increasing old ones is much more immediately before the eyes of the Ministry than of the House of Commons, and the Ministry has also more reason to fear popular resentment against any increase of taxation. It is, moreover, in immediate and constant association with permanent Treasury officers whose influence is generally cast against temporary expedients for staving off the day of reckoning.

In the councils which conduct the local government of the country there is nothing like the Ministry in Parliament, and the system of control consequently has a nearer resemblance, as has sometimes been observed, to that prevailing in the United States Congress. The committees charged with the various departments of the council's work, with the assistance of their executive officers, each prepare their own estimate of expenses for the coming year. These are then all added up and put before the finance committee, which usually hands them on with little or no alteration to the council, merely adding its own estimate of receipts other than rates and a recommendation to the council to make a rate of as many pence in the pound as is calculated to make up the balance required. The council discusses the estimate of receipts and expenses thus put before it, and any member may move alterations in any item. Such motions are frequently made and sometimes, especially, of course, in the smaller councils, carried.

The local authorities have no power to contract debt without special authority. For most purposes this now means that sanction must be obtained either from Parliament by special act or from the department of the central government, called the Local Government Board. Loans must always be accompanied by provisions for repayment within the time for which

Parliament or the Local Government Board's inspectors calculate the work on which the money is to be spent will last. That the prescribed sum is being set aside every year for repayment is ascertained by the Local Government Board in each case. Some authorities are forbidden by statute to borrow more than an amount bearing a certain proportion to the annual ratable value of their area, but these enactments are rendered practically inoperative by other legislation, and have no influence whatever.

Out of annual revenue the authorities may generally spend as much as they please, the unpopularity of rates being regarded as a sufficient safeguard against extravagance. In regard to one expenditure only, that for poor relief, the central government attempts to prevent too much being spent, at any rate in one or two directions, such as relief to persons not required to enter the workhouse and relief to the able-bodied. In other matters the influence of the central government, when exercised, is almost always in favor of increased expenditure. The threat of «withdrawal of the grant» in respect of a particular school is used every day by inspectors of the central board of education in order to compel a local authority to spend more. The central government appoints officers to audit the accounts of the greater number of local authorities, but the auditors of the municipal boroughs (which include all the great cities) in England are elected, under the Municipal Corporations Act of 1832, by the ratepayers. This election is almost always a farce, and the more important city councils have had to provide a proper audit in addition to the one thus provided by law.

Bibliography.— Information as to the actual position of British finance can only be obtained by piecing the facts together from a large number of parliamentary publications, usually known as «Blue-books.» Among the most important of these are the annual returns entitled 'National Debt,' which shows the different kinds of debt existing at the end of each year from 1835 to date; 'Government Departments Securities,' which gives the amount of the state's securities held by the state itself; the finance accounts of the United Kingdom; the 'Postmaster-General's Report,' the 'Annual Local Taxation Returns for England and Wales,' and the same for Scotland and for Ireland conveniently summarized in the annual 'Statistical Abstract for the United Kingdom.' Besides the above, for historical purposes the following parliamentary papers may be found useful: 'History of the earlier years of the National Debt from 1694 to 1786' (C. 9010), and 'Proceedings of the Commissioners for the Reduction of the National Debt from 1786 to 1890' (C. 6539); local authorities' liabilities (No. 306 of 1903); 'Reports of and Evidence taken by the Royal Commission of 1897 on Local Taxation.' Among general works on finance dealing pre-eminently with British conditions C. F. Bastable's 'Public Finance' (3d ed., 1903), is the most complete and gives plentiful references to earlier works; G. Armitage-Smith's 'Principles and Methods of Taxation' (1906) may be useful to anyone requiring less detail. For the history of taxation, consult Stephen Dowell, 'History of Taxation and Taxes in England' (2d ed., 1888); Cannan, 'History of Local Rates in England' (2d ed., 1912), and William Kennedy, 'English Taxation 1640-1799, an Essay on Policy and Opinion' (1913).

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21. BANKING.

Banking in Great Britain as now carried on is the product of a continuous process of evolution; it owes very little to external influences, and can only be properly understood in the light of the study of its earlier developments. Its strength is the strength derived from long tradition founded upon experience, and its weakness is the weakness inherent in a system which has developed with the smallest possible amount of legislative control. This weakness is shown in a lack of logical coherence and in an occasional absence of proper definition.

There are few evidences of banking in the modern sense of the term in England before the 17th century. In the Middle Ages the bankers were mainly money changers and money lenders; they dealt in coin, not in credit. The Italian colony of the Lombards, however, who gave their name to Lombard street, seem to have been well acquainted with the use of bills of exchange, and the banking business of the country was chiefly in their hands after the expulsion of the Jews at the end of the 13th century. During the 16th century, however, the power of the colonies of foreign merchants in London rapidly declined, ending in the breaking up of the German colony in the Steelyard by Queen Elizabeth. In the 17th century it became customary for the wealthier classes to intrust their spare cash to the keeping of the London goldsmiths, a body of men whose occupation inspired the necessary confidence. The transition from goldsmith to banker was a natural and easy one, and the goldsmiths' «cash notes» gradually acquired a degree of negotiability. Some of the existing London private bankers find their origin in the goldsmiths of the latter half of the 17th century. Outside London the early type of country bankers was evolved from the class of substantial merchants. Thomas Smith of Nottingham, for instance, who is the earliest country banker of whom we have any record, and who certainly carried on business as early as 1688, originally combined the business of a mercer with that of a banker.

Owing to the unsatisfactory condition of the public finances under the Stuarts, there was no opening for a public bank such as existed in Amsterdam and other European centres of industry. But the Revolution of 1688 saw the control of the national expenditure pass from the Crown to Parliament. The national credit became, for the first time, an important factor in our economic development, and showed itself in the growth of a national debt. The use of credit spread rapidly and this led to the development of modern banking. To the efforts of William Paterson was due the establishment in 1694 of the Bank of England, founded under the wing of the Chancellor of the Exchequer, Charles Montague, with the object of lending the whole of its capital, £1,200,000, to the state.

The Bank of England.— The Bank of England is the pivot round which centres the whole of modern banking in the United Kingdom.

In no other country, whether in Europe or America, does a bank occupy quite an analogous position. It is not a state bank in the strict sense of the term; its capital is held privately, and its management is not in any way directly or indirectly controlled by the state. On the other hand, during its whole history, it has been more or less under the protection of the state; its operations have been on occasion dictated by the state; its development has been marked by successive loans of its capital to the state in return for the confirmation or extension of its privileges, and it still continues to exercise powers and owe responsibilities delegated by the State.

The Bank of England is controlled by a governor, deputy-governor and a court of 24 directors who are elected by the proprietors on the nomination of the directors. The selection is generally made from the members of leading mercantile firms, and the tradition is not to elect a member of a banking firm or a director of another joint-stock bank. The operations of the bank are now regulated by the Bank Charter Act of 1844. This act divides the Bank of England into two departments, the Issue Department and the Banking Department. The former, as will be seen in a later section, is so strictly regulated by the act that its action is automatic. The latter is for all practical purposes as free from legal restrictions as any other joint-stock bank. Yet free as it is from special legal obligations, it has, by its action in the past as well as by its present position, assumed peculiar responsibilities, which, though ill defined, are well understood, and which the bank does not attempt to disown. These responsibilities are due especially to the bank's position as the government banker, the bankers' banker and the keeper of the country's reserves. The government accounts are kept by the Bank of England, the national debt is managed, exchequer bonds and treasury bills are issued and paid, and many other incidental services of the kind are rendered by the bank. With regard to the other banks, all the settlements at the London Bankers' Clearing House are made by transfers at the Bank of England, where each clearing bank is bound to keep an account. Those banks which do not possess a seat in the Clearing House find it necessary to appoint one of the clearing bankers as agent and to keep an account with that agent. Practically every banker in England can, therefore, draw either directly or indirectly upon the Bank of England and the reserve of the latter has thus to be regarded both as the banking reserve of the country, and also as the gold reserve, that is to say, the reserve to insure the convertibility of the note issue.

Appended is a copy of a weekly return of the Bank of England:

BANK OF ENGLAND

AN ACCOUNT, pursuant to the Act 7th and 8th Victoria, cap. 32, for the Week ending Wednesday, the 25th day of October 1916.

ISSUE DEPARTMENT

Notes issued...	£72,628,275	Government Debt.......	£11,015,100
		Other Securities	7,434,900
		Gold Coin and Bullion......	54,178,275
		Silver Bullion..	....
	£72,628,275		£72,628,275

BANKING DEPARTMENT

Proprietors' Capital.....	£14,553,000	Government Securities....	£42,187,852
Rest.........	3,171,954	Other Securities.........	102,442,757
Public Deposits (including Exchequer, Savings Banks, Commissioners of National Debt, and Dividend Accounts).....	52,543,218	Notes.........	35,942,255
Other Deposits.	112,171,721	Gold and Silver Coin........	1,885,191
Seven Day and other Bills...	18,167		
	£182,458,055		£182,458,055

Dated the 26th day of October, 1916.

J. G. Nairne,
Chief Cashier.

The Private Bankers.— During the 18th century all the banks in England, with the exception of the Bank of England, were private partnerships, the number of partners being limited by an act passed in 1708 to six. Now, however, private banks are very few in number, and their influence is a diminishing one, though at one time that influence throughout the country was great, both socially and politically. The London private bankers ceased to issue notes toward the end of the 18th century, but the country private bankers attached great importance to their note issues up to the time when the Bank Charter Act of 1844 made further extension in this direction impossible. Many of these firms were under-capitalized; the banker was often a tradesman as well, and was too much at the mercy of fluctuations in trade. Consequently in time of monetary stress failures were frequent, especially during the early half of the 19th century. Except that their note issue is limited by the Act of 1844, the law imposes no restrictions upon private bankers, and they are not even compelled to issue balance sheets, though in most cases this has been voluntarily done of recent years. In spite of this absence of control, the existing private banks inspire a confidence which seldom proves misplaced. Most of them have been established for many years, for it has proved increasingly difficult for a new private bank to obtain a footing in the country. All banks possessing more than 10 partners must now register as a company under the Companies Acts.

The Joint-Stock Banks.— Owing to a clause in the Bank Charter Act of 1708, joint-stock banking was not possible during the 18th century, but in 1826 the Bank of England monopoly was so far curtailed as to allow joint-stock banks to be established, with the right of issuing notes, provided they had no office in London or within a radius of 65 miles. By an act passed in 1833, joint-stock banks were permitted within this radius, provided they did not issue notes, and under this act several of the leading joint-stock banks of to-day were founded. The legal disability to issue notes continues until the present day, and has had a marked effect on banking in England. The energies of the joint-stock banks have naturally been centred upon the development of deposit banking, with the result that the habit of keeping a banking account has spread more rapidly and more generally than in most countries, and the use of notes has correspondingly decreased. Practically all the existing joint-stock banks have registered under the Companies Acts with limited liability, and in most cases with a reserve of uncalled capital which cannot be utilized except in case of liquidation. During the last 30 years or so a decided tendency has shown itself, on the one hand, for the amalgamation of the private banks and the smaller joint-stock banks with the more powerful of the latter class, and on the other hand for the spread of branch banking. This has resulted in an increased centralization of the banking system in London, and to a lesser extent, in a few of the leading provincial towns, and in the evolution of a system which is in distinct contrast to that existing in the United States of America. The natural consequence is that the magnitude and importance of the individual bank has very greatly increased. Yet, large as the liabilities of the leading banks to the public are, their capital, both nominal and paid up, and their reserve funds, are sufficiently ample to remove any feeling of distrust which might otherwise be inspired by the volume of their obligations, as will be seen from the accompanying figures taken from the balance sheets of a few of the most important joint-stock banks.

DATE	Bank	Subscribed capital	Paid-up capital	Reserve fund	Current and deposit accounts
Dec. 31, 1915	Lloyds Bank Ltd.	£31,304,000	£5,008,000	£3,600,000	£130,017,000
"	London City and Midland Bank, Ltd.	22,948,000	4,781,000	4,000,000	147,751,000
"	Union of London & Smith's Bk, Ltd.	22,934,000	3,555,000	1,150,000	46,080,000
"	London County & Westminster Bk., Ltd.	14,000,000	3,500,000	4,000,000	106,939,000
"	National Provincial Bk. of England, Ltd.	15,900,000	3,000,000	2,000,000	81,590,000

The *Journal of the Institute of Bankers* publishes annually a statement of the capital, reserve funds, deposits and other liabilities and assets of the British joint-stock banks and such private banks as published accounts. These were summarized in the issue for May 1916 as follows:

		Paid-up capital	Reserve funds	Deposit and current accounts
15	Clearing Banks	£36,338,000	£25,310,000	£834,989,000
19	Country Banks	11,551,000	7,076,000	168,218,000
4	West End Banks	1,635,000	171,000	16,507,000
9	Irish Banks	7,309,000	3,353,000	77,725,000
8	Scotch Banks	9,227,000	7,003,000	140,977,000
20	Australian Banks	22,028,000	15,391,000	218,532,000
6	Canadian Banks	11,827,000	11,224,000	157,481,000
6	Eastern Banks	5,201,000	6,898,000	80,606,000
3	Egyptian Banks	13,810,000	1,994,000	15,860,000
3	African Banks	4,931,000	2,735,000	47,569,000
4	South American Banks	6,300,000	5,800,000	44,521,000
9	Other Foreign and Colonial Banks	5,262,000	940,000	11,840,000
106	Totals	£135,419,000	£88,095,000	£1,814,825,000

Foreign and colonial banks having London offices are, it should be noted, not included in the above tables.

Note Issues.— The Bank Charter Act of 1844, which governs the note issues of English banks, aimed at the eventual extinction of all note issues except that of the Bank of England. This aim has now almost been realized, for at the beginning of October 1916 only nine banks possessed the right of issuing notes, the maximum authorized issues amounting to but £334,820, and the actual circulation being £121,329. By this act the Bank of England was authorized to issue from the Issue Department £14,000,000 of notes, covered by government securities, £11,015,000 of which consisted of the government debt to the bank. This fiduciary issue could be increased, if authorized by an Order in Council, by the addition of two-thirds of the authorized issue of any other bank which forfeited its right of issue or allowed it to lapse, and it amounts at the present time to £18,450,000. Any notes issued in excess of this total must be secured by the deposit of coin or bullion to an equal amount. Silver may form not more than one-fifth of this deposit, but the bank has but seldom availed itself of this privilege. As the Issue Department is compelled to buy all standard gold bullion offered to it at the rate of £3 17s. 9d. an once, and always issues notes against the stock in hand, it can be seen that the amount of notes issued is controlled to a very small extent by the bank directors, and that it increases or decreases according to the amount of gold imported or exported. The Bank of England is, however, not prevented from offering a higher price than the above, should it find it advisable to compete for gold in the market; and in selling gold, if the demand is for foreign coin or bars, the bank can fix its price according to the demand. Any notes not required in active circulation are held in the Banking Department and form the greater part of the Bank of England reserve. The active circulation is in normal times peculiarly steady, averaging about £30,000,000 out of a total issue of from £55,000,000 to £60,000,000.

Bank notes have been in England largely superseded by the general use of checks by the public, and the demand for an elastic currency has never assumed such proportions as in the United States. In times of stress, however, the demand for notes has, in a few instances, exceeded the bank's power of issue, and on four occasions, in 1847, 1857, 1866 and on the outbreak of the European War in August 1914, the government has been compelled to intervene and suspend the clause forbidding the issue of notes beyond the fiduciary limit, except against the deposit of gold. Bank of England notes, which it may be noted are legal tender in all payments except by the bank and its branches, are not issued for any sums below £5, though proposals have frequently been made, notably by Viscount Goschen in 1891, to authorize the issue of £1 notes. Since the outbreak of war in 1914 £1 and 10 shilling currency notes have been issued by the British treasury; they are legal tender and convertible into gold on demand at the Bank of England. The amount in circulation on 4 Sept. 1918 was £270,352,568 in currency notes and certificates. Against these the sum of £28,500,000 was held in gold.

The Clearing System.— The system of collecting checks and settling balances owing between bankers, though to the uninitiated it may appear merely an administrative detail, has, in reality, exercised a very important influence on banking development in England. The problem of clearing checks is comparatively simple compared with the problem as existing in the United States or any other country occupying a large geographical area, because practically every English bank or branch bank is within a day's post of London. Consequently although local checks are cleared through local clearing houses in some of the larger towns, the great mass of checks is cleared through the London clearing house, and this fact has very much accentuated the centralization of banking in London, which is the predominant characteristic of the English system. A seat in the clearing house is a privilege jealously guarded and difficult to obtain, and it was not until 1854 that any of the joint-stock banks were admitted. Those banks which do not possess this privilege appoint a clearing agent, with whom an account is kept and who in many cases acts generally as the London agent. By the rules of the clearing house every clearing bank must keep an account with the Bank of England, and the daily differences are settled by means of transfers to and from these various accounts and a central account called the clearing bankers' account.

The total amount of the checks and other articles cleared through the London bankers' clearing house in 1913 was £16,436,404,000, being the highest total recorded in the history of the house. The number of banks possessing seats in the clearing house is now 17, inclusive of the Bank of England.

The Money Market.— The London money market is the name given to the miscellaneous body of persons who borrow or lend money for short periods, their operations being roughly grouped around Lombard Street, Threadneedle Street, and the adjoining part of the city of London. The money in which they are interested is sometimes described as the short loan fund of the money market. On the one hand is the borrowing portion of the market, consisting largely of the bill brokers, the stock exchange and an undefined group of financiers; on the other, the Bank of England, which is closely connected with the money market, and which, owing to its position as the guardian of the ultimate cash reserves, is also the ultimate lender when money cannot be easily borrowed elsewhere. In between these two extremes are the clearing banks and other banks having London offices, as well as various financial firms, whose surplus unemployed assets form the principal part of the short loan fund. The British government also plays a very important part as a borrower in the money market, and the government of India, through the India council, lends largely to the market. Besides these, there is a group of foreign banks with London offices which exercise a growing influence in the market, both as borrowers and lenders.

The index to the general condition of the market is the bank rate, which is the official minimum rate at which the Bank of England discounts first-class bills offered to it. All bills so offered for discount must mature within not more than three months and must be accepted payable in the United Kingdom and bear one other English signature. The Bank of England is actuated in fixing the amount of the bank rate by the state of the reserve and the prospects of an inflow or outflow of gold, and speaking generally, the bank is interested in keeping the rate as high as expediency will allow. The borrowing portion of the market is naturally anxious to keep the rate as low as possible. If, however, there is plenty of money to be lent outside the Bank of England, the bank rate cannot be effectively maintained at a much higher figure than the market rate, otherwise it would be merely nominal. Therefore, the other London banks to a large extent hold the balance between the Bank of England and the borrowing portion of the market. They are actuated on the one hand by the necessity of employing as large a proportion of their surplus assets as prudence will allow, and on the other by the responsibility of keeping reserves well above the margin of safety. The relations of the Bank of England to the other banks are of the utmost importance and interest. It is possible that in seasons when money is plentiful, the enormous floating balances available for employment in the money market may expose the Bank of England to the danger of a drain of gold. This risk is accentuated by the fact that the funds controlled by the joint-stock banks are far larger than those of the Bank of England. The bank must, therefore, be able to control the market rate should necessity arise, and it must do this by itself coming forward as a borrower (mostly through a broker) and by offering such a rate as to divert the loanable funds of the other banks away from the market. The latter, thus being denuded of funds, is driven to the Bank of England.

The Gold Reserves.— London is recognized as the world's central market for gold and yet her reserve stock of the metal is, notwithstanding the enormous volume of her financial dealings, at time actually less than that of her principal rivals. It is one of London's most cherished traditions that she puts no obstacles in the way of the export of gold, except making it more worth the while of its owners to keep it there. It may be mentioned that more than 60 per cent of the annual production of the world's gold is derived from British possessions.

That London can work on such a small basis of gold is due in the first place to the fact that the English system of a single centralized reserve is a more economical one than the system prevailing in countries where centralization is less developed; secondly, to the smooth working and thorough organization of her banking system, and thirdly, to the excellent reputation of English credit among other nations, which enables her to attract gold from abroad with the least possible delay. But there is a growing feeling that there should be more gold held in reserve in the country; not that bankers are thought to be working below the safety limit, but because the necessity for incessant vigilance results in unstable rates of interest with a consequent derangement of the money market and an undue accentuation of the speculative element in business generally. This feeling has been especially prominent since other countries have adopted a gold standard, and many schemes for an improvement of these conditions have been brought forward. The settlement of the question is rendered more difficult by the dual nature of the Bank of England reserve, which is at the same time a currency reserve and a banking reserve. It is felt that the responsibility of keeping the former belongs partly to the State; that of the latter to the banking community; and the adjustment of the responsibility has not proved easy.

Banking in Scotland and Ireland.— Both in Scotland and Ireland banking has developed on slightly different lines from those of English banks. In Scotland especially the absence of any joint-stock monopoly like that of the Bank of England resulted in the early evolution of a type of powerful bank which crowded out the private banker. Consequently to-day there are only eight banks in Scotland, all with a large number of branches, and the establishment of a new bank is practically impossible. The Scotch people were early in recognizing the advantages of a good banking system, and the use of «cash credits» had an important effect upon the industrial development of the country. In Ireland, banking has had a stormier history, but similar results have been reached, and there are now only nine banks of any importance in the country. Both Scotland and Ireland differ from England in enjoying a circulation of £1 bank notes, which have survived all attempts at extinction.

The note issues of the two countries are governed by Bank Acts passed in 1845, which bear a close resemblance to each other. All the banks in Scotland and six of the Irish banks are banks of issue, and each is allowed to issue an amount equal to the average circulation during the year ending 1 May 1845, together with an amount equal to the amount of gold and silver coin held at the head office or principal places of issue, the silver coin not to exceed one-fifth of the whole. The Treasury was given power, during the European War, to permit issues in excess of these limits The necessity for keeping coin against excess issues of notes brings the Scotch and Irish banks into close relation with the Bank of England. Neither the Scotch nor Irish banks clear their checks through the London Clearing House, but through the clearing houses of Edinburgh, Glasgow and Dublin, hence the connection between these banks and the Bank of England is not necessarily so direct as in the case of English banks. But there are certain recurrent seasons of the year when an increase of the note issues always occurs in Scotland and Ireland, and this necessitates an increase in the stock of coin. As there is no central reserve of gold in Scotland and Ireland, this coin can only be obtained from the Bank of England, and therefore, at these seasons of the year, notably during what is called the autumn drain, the Bank of England reserve is always subject to a demand for coin from these countries, especially from Scotland.

Banking Methods.— British banking methods are distinguished by prudence and caution. The immense amount of their deposits repayable on demand forbids English banks to embark upon the general financial business which forms the principal function of some Continental bankers. English banks do not operate on the Stock Exchange except for purely investment purposes, and then only in what are termed «gilt edged» securities. Neither do banks directly interest themselves in the control or management of commercial or industrial undertakings. Furthermore, the management of the large banks is singularly free from political interference of all kinds. On the other hand, English bankers have allowed to slip from their control many branches of business which belong legitimately to a banker. Much of the bill-discounting business is in the hands of the bill broker, who is an expert middleman between the banker and his customer. Until the last few years the business of foreign exchange was left almost entirely in the hands of specialists, or of the branches of foreign banks established in London. Most of the large joint-stock banks have, however, now opened foreign departments and are endeavouring to bring under their own control this branch of banking.

Attempts have been made to induce the English banks to undertake a more «adventurous» type of banking, more akin to that prevalent over the whole of the European continent, but English bankers consider it unsound banking, in view of their large liabilities to pay on demand, to share the direct trading risks of their customers. It has lately been suggested that a new type of bank should be founded to undertake financial risks in support of trade which the existing type of bank decline, and that the characteristics of such new type should be that it should possess a large paid-up capital and that the acceptance of deposits repayable on demand should be restricted or forbidden. An institution of this type has been established under the title of the British-Italian Corporation with the object of promoting closer trading relations between Great Britain and Italy, and a committee of the Board of Trade, with Lord Faringdon as its chairman, has recommended the establishment of a British trade bank with a capital of £10,000,000 which, without coming under government control, should receive as much official recognition as possible.

The liabilities of English banks consist almost entirely, first, of the current account balances in their hands, repayable on demand, on which it is not usual to allow any interest, and secondly, of sums deposited repayable at a fixed notice, usually seven days, on which London bankers allow interest at one and a half per cent below the Bank of England discount rate. London bankers also accept, on behalf of their customers, bills drawn from abroad, proper security being deposited to cover the bankers' liability. Their assets consist of cash on hand and at the Bank of England or their London agent, money lent at call or short notice to the money market against security, bills, being the acceptances of other bankers or leading merchants bought in the market, investments in first-class stock exchange securities, and advances to customers, either in the form of loans, overdrafts upon current account, or bills discounted.

During the middle of the 18th century, England was subjected to a series of acute banking crises, notably in 1847, 1857 and 1866, but if we except the grave situation created in 1890 by the liquidation of Barings, who, it must be noted, were not bankers, the country has been free from such disturbances since 1878.

The outbreak of the European War in August 1914 threw a heavy strain on the banking systems of all countries, neutrals as well as belligerents. It is as yet too early to discuss the lessons which may be learned from the experience gained since that time, but it may safely be said that the British banking system has stood the ordeal well. The worst criticism that has been levelled against it is that bankers displayed a lack of courage in the early days succeeding the declaration of war. Two or three circumstances stand out clearly; first the strength, unexpected in the circumstances, of London's international position at the outbreak of war, when instead of the gold famine expected by some, gold poured into London from all quarters. Secondly, the advantage to the country of having its banking resources liquid instead of locked up in trading ventures, whereby the maximum financial assistance has been forthcoming for carrying the country through the ordeal of the war. Thirdly, the vigor and efficiency displayed by the Bank of England as the pivot of our whole banking system.

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Felix Schuster,
Governor of the Union of London and Smiths Bank, Limited, Vice-President of the Institute of Bankers.

Ernest Sykes,
Secretary of the Institute of Bankers, and of the Central Association of Bankers.

22. COMMERCE — 18TH CENTURY. — English commerce of the 18th century is remarkable for the revolution in the methods by which it was carried on, for its growth under the great Whig system of protection and for its culmination in a tremendous expansion with the coming of machinery. English foreign trade had been largely opened out by merchant companies. The foundation idea was that English goods should be sold at a high price and that there should be no glut of goods, no undercutting, but a «well ordered trade.» Hence rules as to quantities to be exported were a great feature of these companies. There was no idea of pushing trade or selling at a low price and getting quick returns. Moreover, the numbers admitted to the companies were limited by the high fees charged for entrance, while no one who did not belong to them could lawfully engage in the trade. The only open trades were those to France, Spain and Portugal. Hence a regular attack on the monopoly of the companies was carried on and this constituted the early free trade movement. It was successful; after the Revolution the entrance fees of the companies were reduced by Acts of Parliament; only the East India Company and the Hudson's Bay Company continued strict monopolies. With the throwing open of trade it was possible for an enterprising man to carry on commerce on any scale, to push his wares and generally increase his sales wherever he could without limitation of any kind. This amounted to a veritable revolution in commerce. Alongside of this opportunity for expansion came the emigration of the Huguenots into England. Besides introducting many new industries such as silk, cotton printing, paper and linen, there was no branch of English trade which they did not improve with their taste and skill. Hence England had a more varied assortment of goods with which to push her trade. Moreover, the Huguenots preserved their old business connections, and England inherited in this way a great deal of the French trade.

At the Revolution of 1689 the control of economic affairs definitely passed to the House of Commons, and the Whig party became the arbiters of national policy. The Tories were inclined toward «free trade.» They believed in favoring the consumer and in removing restrictions on intercourse, especially with France, the chief industrial rival of England. The Whigs on the other hand held very decidedly to a policy of encouraging industry and in so manipulating commerce that it should react on the prosperity of industry. Hence they devised a system of bounties for encouraging the exportation of silk, linen and corn. Bounties were also given to the fishing trades. They tried to stop the growth of competing industries in both Ireland and the colonies, and when Scotland showed signs of becoming a rival the Union was brought about.

In their fiscal policy and in their trade treaties the same Whig ideas were carried out. We first see them applied in the commercial relations between England and France. England's great industrial competitor at the end of the 17th century was France. Colbert had been doing everything in his power to encourage French industry and had gone so far, in 1667, as to put prohibitory rates on English cloth. Englishwomen with (to the masculine mind) an extraordinary perverseness would insist on wearing French goods when they could get them. Hence, according to the opinion of the day, to shut out French goods was to assist English industry in the best possible way. To this the Tories were opposed, but the Whigs were successful, in 1678, in carrying an Act prohibiting trade and commerce with France. A system of high duties was substituted for prohibition under James II, but the Whigs returned to the early policy. In 1713 a clause was added to the Treaty of Utrecht to the effect that England should admit French goods as in 1664. This gave rise to a tremendous controversy. Again the Whigs were successful; the commercial clauses of the treaty were not carried out, and the policy of protecting English industry by cutting off trade with France was not reversed till the treaty concluded by Pitt in 1786. By that time England no longer feared French competition and English manufactures were so much sought after in France that there was a tremendous outcry on the part of French manufacturers.

The Whig desire to shut out competitors extended to another department of commerce, namely, the trade with India. The East India Company had been bringing back silks and muslin and cotton goods which were worn by the «greatest gallants» as well as by «the meanest cook maids» instead of good English cloth. Hence employment was being diverted from Englishmen to Hindoos, and in 1700 an act was passed by which East India goods might be warehoused for re-exportation, but they might not be sold within the country.

But it was not enough to shut out possible competitors. Definite encouragements to English trade were given by the Methuen Treaty negotiated with Portugal in 1703, and by the Asiento Contract obtained from Spain in 1713. The Portuguese had prohibited the importation of English cloth, and in 1703 Mr. Methuen was successful in getting this prohibition removed on condition that Portuguese wines were admitted into England at two-thirds of the duty on French wines. The trade with Portugal thus opened up was reckoned to be a very large one, and was especially cherished since a large part of the returns was paid in Brazilian bullion, with which we could renew our depreciated coinage.

By the Asiento Treaty the Whigs got a large part of the slave trade with Spanish America into their hands. They obtained the right to import 4,800 negroes annually and to send one vessel of 500 tons to import goods into the Spanish colonies. The West Indies became a great depot for this trade and under the cover of the one ship the English got possession of much of the Spanish-American trade. From every point of view the slave trade commended itself to the general opinion of the time. It encouraged shipping, promoted trade with Africa — which country took English cloth in payment for slaves — it supplied labor to the West Indies and Virginia and helped the agricultural development of the colonies. Moreover the slaves were a means of carrying on trade with Spanish-America. But from the English point of view the economic effects were still more important. As long as the colonies had slaves they would never take to manufacture, the negro being incapable of the necessary training. The colonies would continue therefore to grow the tropical commodities for England to distribute.

Sir Robert Walpole began to reform the fiscal system with the same object of stimulating industry through commerce. Accordingly he overhauled the book of rates between 1721–24 with the object, to use his own words, of making «the exportation of our own manufactures and the importation of the commodities used in the manufacturing of them as practical and easy as may be.» He repealed or reduced the import duties on raw materials and arranged for manufactured exports to be duty free. He next began to try and stimulate the warehousing trade which the Navigation Acts (see NAVIGATION ACTS, article 24) were partly designed to create. He hoped to make England «one general free port and a magazine and common storehouse for all nations.»

This system of deliberately building up English industry was continued until the time of the younger Pitt, who, following out the Tory tradition of free intercourse, not merely reopened trade with France but tried to carry free trade between England and Ireland, unsuccessfully however, owing to the hostility of the English manufacturers. He also wished to allow American ships to trade freely with England and the West Indies in spite of the Navigation Acts. But this Tory reversal of the Whig policy was doomed to failure.

The French wars prevented any relaxation of the system for revenue reasons, and it was not until 1846 that the great breach with the Whig policy of the 18th century was definitely made.

During the 18th century English commerce steadily increased in almost every direction, especially with the colonies. In 1699 the exports had been estimated at £7,302,716. By 1720 they were £8,681,200 and by 1740, £11,469,872. In 1760 the figure had reached £15,579,073; in 1771, £17,161,146; while with machine products the total reached £34,381,617, in 1800.

The imports in 1699 were £3,482,586; by 1720 they had nearly doubled, being £6,090,083. In 1760 they were £9,832,802; and in 1771 had reached £12,821,995. In 1800 they were £28,257,781.

It is exceedingly difficult to say whether this increase was a result of the Whig policy or no, but the fact remains that while they held the reins of power English trade extended as they intended it should, and thus prepared the way for the introduction of machinery. It was not accident that the industrial revolution (see GREAT BRITAIN — INDUSTRIAL REVOLUTION) occurred in England when it did. At the Restoration English industry was very backward;

English agriculture undeveloped; and English commerce small. By the end of the 18th century England, in spite of the loss of her American colonies, was the greatest trading country in the world. Her goods, through sheer cheapness, were forcing their way into every country. She was the great carrier of the world, and the only people that could compete with her were the Americans, whose shipping had grown up under English protection. She was able to withstand, by her wealth, the great financial strain of the French wars, and to control the access of colonial produce to Europe.

That many mistakes were made is no doubt true, and Adam Smith did not hesitate to expose them; but the objects which the Whigs had at heart were attained to an extraordinary degree during their tenure of power.

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23. BRITISH COMMERCE. Volume of Trade.— It has been estimated that nearly a fifth of the working population of the United Kingdom depends for existence on the sale of its products in foreign markets; add to this the classes engaged in ocean transport, in market organization and financial settlements, and it is possible to arrive at some conception of the magnitude of the interests involved and the importance assigned in the United Kingdom to oversea commerce. Parliament and the Press never tire of the theme. Not merely the Board of Trade, but all other great departments of administration, whether concerned with defence, revenue, foreign and colonial affairs, or education, find themselves involved in one way or another in the consideration of the interest of international commerce. So far, indeed, has been carried this exclusive attention to external relations, that the existence of a home market is not seldom forgotten or ignored. Some ground for this forgetfulness may be found in the great value of the foreign trade — over $7,000,000,000 imports and exports in 1913, the last normal year before the war — in relation to a limited population and area; but its real importance in the economy of the United Kingdom appears only on a further analysis of the figures.

Of the imports, valued at £769,033,959, three-fourths must be credited to food and raw material, the rest to manufactures of various kinds. The exports are made up of £525,461,416 of British produce and £109,655,718 foreign and colonial re-exports. Manufactures constitute the mass of British produce exported, with one important exception — coal. The figures imply much that is interesting both in past history and present organization. A country of restricted area and resources obtained, through various economic and political accidents, a start in the industrial race a century ago. Some of the necessary raw materials of industry it cannot produce, of others the quantity is insufficient for its growing demands. Increasing specialization leads to greater dependence on certain types of foreign imports and greater need for a market abroad for the constantly increasing surplus of manufactures. Food, too, must be brought from more favored regions, and the very success of manufactures breeds a natural tendency to neglect the interest of agriculture; though native resources, utilized to the utmost, would still be insufficient, in the present state of agricultural science, for the needs of the growing industrial population. The basis of the present system, and the only home product, on a large scale, which is more than sufficient for the needs of the moment, is coal. Hence it is exported from those districts where it is not utilized in local industries, and where access to the sea is easy; its ultimate functions being to provide power for British and foreign shipping or for foreign factories.

The entrepôt business, in foreign and colonial produce, again represents a historical advantage. It is a relic of the partial monopoly of the carrying trade, and the control of the supply of tropical, eastern, and colonial commodities to continental markets, long enjoyed by the United Kingdom. Though aided by the principle of inertia, and the facilities of old-established commercial centres, such business has not increased at a rate proportional to the general movement of trade; in fact, for a long period it was stationary at about £60,000,000, though recent years have witnessed a great improvement. This slow rate of growth is due mainly to the development of continental shipping and the establishment of direct relations between the European consumer and distant markets, which have been conspicuous features in the elaboration of international commerce during the last generation.

The last point noteworthy in the general figures, is the vast difference between the value of imports and exports. Apart from minor questions of statistical method, the excess of imports represents two main facts: firstly, returns for the service of some 11,000,000 tons of foreign-going shipping, which carried nearly the whole trade of the United Kingdom and no inconsiderable portion of that of the rest of the world; secondly, payments of interest by debtor nations and foreign industries to the great creditor nation of the 19th century, or in some cases, perhaps, the redemption or creation of capital liabilities.

Classification and Distribution of Imports. — The close relationship between foreign commerce and internal organization is best seen by tracing commodities from their sources or following them to their destination within the country. For this purpose much of the United Kingdom can be removed from the map. A small fragment of Scotland, a single port in Ireland, the north and part of the midland and west of England, with London and its subsidiary ports cover the whole region of industrial and commercial importance. London, including the minor ports from Harwich to Southampton, receives about 40 per cent of the total imports of the United Kingdom. Of this vast trade, food, in one shape or another, accounts for nearly half; fruit, eggs, vegetables, butter and other minor agricultural products, with large supplies of beet sugar, from the neighboring districts of Europe; grain and meat from more distant countries; tea, coffee, rice and miscellaneous tropical and sub-tropical products; all are poured in to supply the needs of the dense population of the London area, or to be distributed over the lines of communication radiating northward and westward.

Apart from food, the most important items of note in the statistics of London and its subsidiary ports are the silk, woolens and other textiles consigned from France and other parts of the continent. In this matter London appears as the great consumer of luxuries; on the other hand the receipt of raw wool from distant parts of the world to the value of some £37,000,000, and of large quantities of tin from the East, shows her as a controller of markets and distributor of commodities which she does not utilize herself. For the rest, the trade is made up of innumerable minor manufactured articles, chiefly from European countries, and of miscellaneous raw materials from every region of the world, partly for use in the many industries of the London area, partly attracted thither by facilities of transport and marketing.

The only group to compare with London consists of Liverpool, with the Mersey ports, now including Manchester. Together they take another 30 per cent of the total imports of the kingdom. Roughly, a third is staple food stuffs, mainly from across the Atlantic; Liverpool vieing with London as a distributor of these commodities; another third is raw cotton, nearly the whole of the supply needed for native industries; while in the miscellaneous group, the cane sugar and tobacco of the Indies, the palm-oil, nuts and rubber of the African and American tropics are interesting reminders of the intimate connection of Liverpool with the older colonial and plantation trade.

The remainder of the import business is divided between the eastern group of seaports, represented by the Forth, the Tyne with Middlesbrough, and the Humber; and the western, represented by the Clyde, the Severn and Belfast. The main intercourse of the east coast is naturally with the continent of Europe, from the Baltic to the Black Sea; and, for the most part, it can be regarded as merely an extension of London for the receipt of continental goods. One commodity alone deserves special remark. Iron, in various elementary stages of manufacture, enters the Humber from abroad, while Middlesbrough and the Tyne find it necessary to import more and more foreign iron ore for their smelting industries. The native supplies, for certain purposes, show a distinct and unpleasant tendency to run short. On the west coast, the Clyde and Severn, like Liverpool, need food for the population concentrated on their coal areas, and have a small share in the sugar and tobacco of the plantation trade. Glasgow must look abroad for iron ore, Cardiff and South Wales for iron, copper and tin, while Belfast needs flax and linen yarn to supplement native supplies.

All ports alike, from London downward, absorb vast quantities of timber in various shapes. The native supply is a thing of the past; so northern Europe, North America and the tropics are called in to provide this necessary material for railways and mining, and above all for one of the greatest home industries,— building — an industry which does not figure in the export list but is none the less of vital importance in the general economy of the country. An annual timber bill of £33,000,000 is a fairly prominent item in the national balance sheet. For food, raw materials, luxuries, for nearly all the needs of civilized existence, the United Kingdom depends partly or wholly on supplies from beyond the seas; it is small matter for surprise that the question of safety of trade routes, on the one hand, and of the economic and political policy of the regions from which the necessary supplies are drawn, on the other, should loom larger and larger in the view of statesmen, as the economic dependence of the country steadily increases.

Classification and Distribution of Exports. —As an outlet for those districts which produce the chief British staples, London cannot compare with Liverpool. Over a third of the total exports of British produce goes by way of the Mersey, only about a quarter by way of the London group. At Liverpool, cotton goods provide half the export, then come iron and steel in all stages of manufacture, large quantities of woolens, with textile machinery, chemicals and earthenware. In fact the main industries of Lancashire, Yorkshire, Cheshire and the *Midlands* are here represented roughly in order of their relative importance. With one or two qualifications, the foreign trade of Liverpool may be taken as a type of that of the whole kingdom.

The export business of the London group is less easy to define, partly owing to the many minor industries of London and district, partly owing to the modifying effects of cost of transport from the great producing centres. Textiles still hold the first place in the customs list, but large quantities of leather, millinery and apparel, paper and stationery, provisions, confectionery, pickles and medicines, suggest rather the minor activities of a great centre of population than the staple industries of modern life. In short, London may be regarded rather as a general store, handling every kind of goods and forwarding to all parts. The main activities are typical of commercial rather than industrial England.

The export trade of the east coast has certain peculiarities worth a moment's attention. Many million tons of coal leave the Tyne and Humber for European ports, while the textile industries are represented by yarns and machinery rather than finished goods. A certain amount of iron and steel, with ships and their machinery, completes the main features of the trade. The European markets, owing to their advance in industrial organization, tend to be accessible only to certain restricted groups of British industries; the changing conditions are reflected in the customs records of the eastern seaports.

On the west coast, a few million pounds worth of cotton, iron and steel, ships and machinery represent the industrial activity of the

Glasgow district; while the linens of Belfast, the iron, steel and tin plate of the Severn ports and £18,000,000 worth of steam coal from Cardiff complete the schedule of the chief British exports.

In the entrepôt business, London and Liverpool alone are worthy of notice. London is still the chief European market for wool, though her position has been affected by the increase of direct relations between Australia and the continent. But the supreme control of the world's tea trade has dropped from her grasp. The teas of China, whether destined for Europe or America, no longer fill her warehouses. In this, as in other less important departments of commerce, the development of commercial policy of the Powers in the Far East and more particularly the activity of their shipping, have gradually undermined those special advantages on which the great entrepôt trade was founded. London still remains a convenient market for miscellaneous tropical and colonial products, and this position she shares with Liverpool. Broadly speaking, the one looks to the east for imports, the other to the west; together they provide a collecting centre for minor commodities of the whole world. So long as British trade and shipping exist on their present scale, and London maintains its reputation in the financial transactions of commerce, this type of commission business is likely to persist, though it may represent a decreasing proportion of the total commercial activity of the country.

Changes in Character and Sources of Imports.— The ultimate destination of exports or the origin of imports may be a matter of indifference to the individual trader; but in a review of the whole movement of commerce, the question of sources of supply and markets for products is of the highest interest. In recent years there have been great changes both in the distribution of British manufactures exported and in the sources of the national food supply. Raw materials for the great industries have been affected to a less degree. A generation ago Europe vied with North America as an exporter of wheat and flour to the United Kingdom; at the close of the century her share had fallen from over 40 to less than 10 per cent. North America had annexed the trade, the larger share falling to the United States, though Canada was rapidly improving her position. India, the Argentine Republic and Australasia merely supplemented the deficiencies of this supply. But the situation has changed radically, in the last 10 years, through the enormous deficiency in the supply from the United States, coupled with a corresponding rise in that from India, the Argentine and Eastern Europe. Moreover, there are elements of permanence in the change. Apart from the fact that the United States may have considerably less to spare, in the near future, after the satisfaction of the needs of her own industrial population, there are evident economic advantages involved in the purchase of food supplies from those regions which, in their turn, provide an equivalent market for British manufactures. The imports of live cattle from Europe have also ceased, while a new trade in fresh meat with the most distant regions has been created under modern conditions of transport.

In spite of these changes there has not been that decrease in west-European imports into the United Kingdom which might have been anticipated. Though staple foods for export are only available on a large scale in the non-industrial eastern districts of Europe, the neighboring countries of the west still supply, for British consumption, large quantities of the minor perishable food products. Superior organization and better facilities for transport enable the small grower abroad to supply the great consuming centres with much that could readily be produced in agricultural England. Compensation has also been provided by the enormous growth in the import of beet-sugar, stimulated by the bounty system — a growth of many hundred per cent in 20 years. Since the abolition of the bounties by the convention which came into force in 1903 there has been a considerable decrease in the supply of beet-sugar from Europe, with an increase in that of cane-sugar from tropical regions; but it is impossible to forecast the ultimate position of equilibrium. Further compensation is to be found in the increasing volume of the stream of those continental manufactures which find a ready market in the United Kingdom. The net import of foreign manufactured goods, more than half of which are ready for consumption, has doubled in the last generation and was valued at upwards of £193,000,000 sterling in 1913. The greater part of this must be credited to the industrial regions of western Europe. Formerly one of the best markets for the British manufacturer, they are now reversing to some extent the earlier movement, and invade with success the British market, either supplementing or competing with the native industries.

In raw material the changes are less conspicuous. American cotton and Australian wool still dominate the market; but the tin for British industries is now largely imported from Malaya and Australia, while even for iron ore it is found necessary to utilize more and more the Spanish, Scandinavian and other foreign supplies. The import trade in raw material and food has one characteristic common to all its branches, that is the vastly increased distance from which commodities can be gathered and to some extent the multiplication of possible alternative sources. In fact, the need of an alternative, particularly when no native supply is available, has so impressed itself, not merely on the individual importer but on the great manufacturing interests as a whole and on many responsible officials and politicians, that it bids fair to give rise to a new type of commercial policy, in defence of the national economic interests.

Foreign Markets.— The question of a foreign market for British manufacturers raises more difficulties than that of the source of imports. As a general rule, the supply of the latter can be safely left to the foreign countries interested in their production; but British exports must seek out their market in the face of the world-wide competition. In this connection it is worth noting that the proportion of manufactures in the total exports of British produce to the chief protected foreign countries, fell in the last 20 years of the 19th century from 85 to 72 per cent. In the same period the total export of coal more than trebled, while the number of the population engaged in mining shows a heavy relative and absolute increase. These two facts, taken together, are not without significance; though a proportion of the coal exported is accounted for by the enormous increase in the tonnage of British steam shipping engaged in the trade of the world.

Apart altogether from the effects of fiscal policy, the development of the industrial activities of Western Europe and the United States has necessarily narrowed the market for British manufactured staples. Both regions take a smaller proportionate share of British exports, while in the case of the United States there has been a heavy absolute fall, for which woolens and tinplate are largely responsible. The European trade has maintained its value and in some cases has shown a tendency to increase; but the type seems to be changing steadily; coal, yarn and machinery for continental industries tend more and more to take the place of finished goods. The census returns provide a valuable comment on the statistics of exports. Among the greater industries, iron and steel and their manufactures alone show an increase in the proportion of the population employed, comparable to that in mining. Woolens and other textiles show a large decrease. Cotton shows a slight increase in the total number but not commensurate with the growth of population. But allowance must be made for more efficient machinery and labor; while the activity of Lancashire during the last eight or nine years, as evidenced by the building of new mills and the greatly increased import of raw cotton and export of finished goods, suggests that the next census will tell a very different tale.

The cry for new markets and the «open door» is not without good foundation. In the West the United States has evident advantages; Germany, owing to her position and her land frontiers, is exceptionally favored for intercourse with the purely agricultural regions of Europe; while, in the Far East, Japan has started on an industrial career which compels her to import food and raw material rather than finished products. There remain as open markets China nearer Asia, South America and the British colonial possessions. The fact that staple British exports have found a rapidly expanding market in the self-governing colonies has masked the decline in other directions. How long the expansion will continue it is impossible to say; the colonies are not without their own individual aspirations, but it is likely to be long before their manufacturing capacity overtakes the demand of their vast agricultural populations. It is impossible to forecast the inevitable changes in international trade resulting from the European War.

Hitherto the British producer and merchant have risen superior to difficulties; ground lost in one direction has been gained in another, while competition has served as a stimulus to greater exertion, and in spite of fluctuations and temporary depressions, the volume of British trade has steadily increased; and this fact gives strong support to the view that the energy and adaptability of the United Kingdom, alike in the spheres of industry and commerce, are as yet far from reaching a limit.

The following statistical tables give a general view of the progress of British trade for 10 normal years.

VALUE OF IMPORTS AND EXPORTS OF THE MERCHANDISE OF THE UNITED KINGDOM.*

YEAR	Total imports	Exports of British produce	Exports of foreign and colonial produce	Total imports and exports
	£	£	£	£
1904.	551,038,628	300,711,040	70,304,281	922,053,949
1905.	565,019,917	329,816,614	77,779,913	972,616,444
1906.	607,888,500	375,575,338	85,102,480	1,068,566,318
1907.	645,807,942	426,035,083	91,942,084	1,163,785,109
1908.	592,953,487	377,103,824	79,623,697	1,049,681,008
1909.	624,704,957	378,180,347	91,344,819	1,094,230,123
1910.	678,440,173	430,589,811	103,776,104	1,212,806,088
1911.	680,157,527	454,119,298	102,759,134	1,237,035,956
1912.	744,640,631	487,223,439	111,737,691	1,343,601,761
1913.	769,033,959	525,461,416	109,655,718	1,404,151,093

* The important difference between the system of the United Kingdom and other systems is that the former shows the values at the time of import and export, whilst in most other countries the prices are computed at the prices of a year or more before.

The average share per head of population in net imports (i.e., total imports *less* re-exports) for the same decade was distributed as follows: 1904 — $54.16; 1905 — $54.42; 1906 — $57.98; 1907 — $60.80; 1908 — $55.86; 1909 — $57.52; 1910 — $61.40; 1911 — $61.18; 1912 — $67.94; 1913 — $68.74.

The principal imports on which customs duties are levied are beer and spruce, chicory, cocoa, coffee, dried fruits, motor spirits, spirits, sugar, tea, tobacco and wine — spirits, sugar, tobacco, tea and wine yielding the bulk of the entire levies, about $170,000,000 per year.

Bibliography.— *Volume of Trade.*— The source of all ordinary information as to British trade is the 'Annual Statement of Trade with Foreign Countries and British Possessions,' supplemented by the 'Annual Statement of Navigation and Shipping.' The chief defect in the series is that until 1904 the figures represented ports from and to which the goods are shipped, and not countries of origin or ultimate destination. In other words, British trade relations, particularly with certain European countries, are entirely misrepresented. A supplementary volume is now issued which attempts to get at the real facts of the case.

Exports and Imports, Distribution and Changes.— Much valuable information as to the historical growth of British trade can be gathered from the 'Report of the Royal Commission on Trade Depression' (1886), supplemented by Parliamentary papers. The Parliamentary paper, 'Food Supplies Imported 1870–1902' (No. 179, 1903), gives in detail the changes in the sources of supplies in the period. The 'Report of the Royal Commission on Food Supply in Time of War' contains much miscellaneous information as to sources of imports, including raw materials.

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24. NAVIGATION ACTS. In the 17th century the independence of the English nation as a nation had been secured. Spain had been conquered at sea, and henceforth maritime power became more than ever the great national ideal. Comparatively safe from the dominance of a foreign power, and her internal resources in process of rapid development, all the conditions were present for England to expand beyond the seas and to attempt to secure for herself that pre-eminent position in the world's commerce hitherto held by Holland. England's dominating purpose during the 17th century was to build up her foreign commerce, to outrival the Dutch at every point, to constitute herself the great warehousing and distributing depôt of Europe and to induce the colonies to contribute to the power of the mother country by growing commodities for her to re-export. When Scotland or Ireland seemed likely to encroach on the colonial trade they were carefully excluded.

All through the changes of dynasty from Charles I to the time of the Whig predominance the same idea holds good; and the instrument by which all this was to be effected was the series of Navigation Acts or Acts of Trade.

The Navigation Acts were no new thing in the 17th century. There was one as early as 1390 (5 R. II, St. I, c. 23). It forbade goods to be exported or imported by Englishmen except «in ships of the King's liegance.» This act was inoperative, however, owing to the lack of English shipping, but the idea of the statute was never lost sight of. A similar act was passed in 1463 (3 Ed. IV, c. I) but was dropped after three years. Efforts were again made to enforce a monopoly for English ships under Henry VII (I H. VII, c. 8 and 4 H. VII, c. 10) and in 1540 the old laws were re-enacted, the freights defined, and inducements offered to aliens to use English ships. Elizabeth gave up the policy of confining English trade generally to English ships and by an act of 1563 (5 Eliz., c. 5) merely reserved the coasting trade.

In the 17th century the Navigation Acts were revived. In the early part of the century they took the form of royal letters and proclamations, but in the latter part the policy was embodied in the statutes of 1651 and the series of acts between 1661 and 1696.

From the 17th century till the final repeal of the acts between 1822 and 1854, the policy of confining English and colonial trade to English ships was consistently pursued.

The novel feature of the 17th century Navigation Acts did not lie so much in their continuous enforcement as in their enlarged scope and their application to the colonial trade. The Dutch being the greatest traders of the time had got the bulk of the English colonial trade into their hands by making advances to the colonists on the security of future crops. These they duly received when grown and distributed from Amsterdam. This conduct the English regarded as directly contrary to the whole object of colonization, the general view at that time being that people should only leave the mother country in order to build up English trade and shipping elsewhere.

The feeling of jealousy with regard to the Scotch was almost as strong. It is true that they were not such formidable rivals, but they were said to sail cheaper than the English, and as they had close trade relations with the Dutch it was feared that the latter might get hold of the English trade through the Scotch.

«The Plantations are His Majesty's Indies» runs a report of the Commissioners of Customs (30 Oct. 1661) «without charge to him secured and supported by the English subjects who employ above 200 saile of good English ships every year, breed abundance of mariners and begin to grow commodities of great value and esteeme.» Were the Scotch allowed to trade freely on the same footing as Englishmen it would «in one word overthrow the very essence and design of the Act of Navigation.»

The jealousy of both the Dutch and the Scotch was keenly felt in the 17th century. As soon as the plantations showed signs of development measures were taken, primarily against the Dutch, in order to secure the growing trade for England.

In 1621 we get the first of a series of orders and letters sent out by the King to the colonial governors with the object of having all colonial goods brought to England and brought in English ships. In 1624 a proclamation ordered that no tobacco should be imported in foreign bottoms. In 1629 another proclamation re-enacted the old navigation laws as to English trade generally. In 1633 the question of the colonial trade was referred to a committee who reported strongly in favor of confining such trade to English ships, and an order was accordingly issued to this effect. In 1637 letters were sent out to the governors in America and the West Indies ordering them to «strictly and resolutely» forbid all trade and traffic with the Dutch.

During the Civil War the Dutch seem to have got more and more of the trade of the English colonies into their hands, and it became necessary to revive the policy which had been pursued under Charles I. This was done in the act of 1651, which led to the Dutch war. The commonwealth wished to do a popular thing by appealing to the English hatred of the Dutch, and they no doubt also intended to give the ship owners some compensation for the overwhelming misfortunes which the Civil War had brought on them. The restrictions of the act were not new, nor was it enforced any more effectively than previous acts had been. Cromwell indeed did not believe in the policy, and so great was the danger to English shipping from the Spanish and Royalist privateers that the government was only too glad to see trade kept alive in neutral ships. In the colonies the statute seems to have been generally disregarded. In 1660 (12 C. II, c. 18) the act of 1651 was re-enacted with certain additions. The act of 1651 had declared that no goods «of the growth, production or manufacture of Asia, Africa or America» should be imported into England except in English or colonial ships. Goods from Europe might come either in English vessels or in the ships of the country which produced the goods. As Holland was not a producer she would be particularly affected by this provision. In the 1660 act the various clauses were made more precise. Both the import trade and the export trade of the plantations were to be carried in ships, English built, English owned and manned by a crew of whom three parts were English. By a later statute (14 C. II, c. 11) colonial shipping was put on the same footing as English for all the purposes of the Navigation Acts. Goods from Europe were subject to the same restrictions as in the act of 1651, i.e., they might be imported either in English ships or in ships of the country of origin. No attempt was made to restrict the export of English goods to English ships except in so far as the plantation trade was concerned.

The policy of developing the warehousing trade through the Navigation Acts as outlined by Charles I was again taken up by his son. A number of commodities — sugar, tobacco, cotton, wool, indigo, ginger, fustick and dyewoods — were «enumerated,» and could only be exported from the colonies either to England or to another English colony. Rice and naval stores were added to the list in 1706, and copper and beaver skins in 1722.

The act of 1663 (15 C. II, c. 7) further extended the policy of making England a great entrepôt by enacting that commodities of the growth or manufacture of Europe that were needed by the colonists should be shipped from England in English or colonial vessels.

Thus, according to the Navigation Acts, the bulk of colonial produce had to be brought to the mother country, and the colonists were bound to take their manufactures from her or through her.

It should be observed that by these acts the Scotch were shut out from the plantation trade and were not even reckoned as English for the purpose of making up a crew (13 & 14 C. II, c. 11) until the act of union. They petitioned to be allowed to trade with the colonies, but a commission reported strongly against it because such liberty would bring infinite loss to His Majesty's customs and «much prejudice» to the English.

As to Ireland, enumerated goods could be imported there, according to the act of 1660, and it seemed as if an Irish warehousing system might have developed since food was so cheap that many ships engaged in the colonial trade went into Irish ports to victual. English jealousy of Ireland was, however, too strong for her to be allowed to encroach on a province which England regarded as the foundation of her prosperity. An act was passed in 1670 (22 & 23 C. II, c. 26) by which the staple colonial commodities were henceforth brought to England only. In 1695 Ireland was prohibited from receiving even non-enumerated commodities as the Bristol merchants complained of the injury done to their trade.

After the Restoration, English shipping increased rapidly; but it is not easy to estimate the precise effect of the acts in building up the maritime power of England. The English mercantile marine doubled between the Restoration and the Revolution and continued to grow all through the 18th century. Petty, writing in 1699 ('Political Arithmetic,' pp. 258–259), said that shipping had increased three or four fold in the last 40 years; and Child ('Discourse of Trade,' 1695), chronicles the great increase of «Wharfs and Keys» to accommodate the growing trade. It is exceedingly difficult to estimate the extent to which this increased prosperity was due to other factors as well as the Navigation Acts. The English had been pushing trade in all directions after 1660; Charles II had concluded a series of trade treaties which gave great openings to English merchants; the banking system was developing with increased facilities for traders; the old system of a steady but restricted trade carried on by merchant companies was giving way to the new principles of pushing trade anywhere and by all means. All these things contributed to increase the demand for shipping. But without the Navigation Acts it might have been Dutch shipping that would have profited, since Holland carried at much cheaper rates than any other nation. At any rate the acts did secure that the increase of trade should benefit national shipping, although in the Baltic trades the results were at first disastrous. The English had not sufficient shipping for the trade, hence they could not get timber, and accordingly English ship building was hampered. It indeed became necessary to relax the restrictions as far as Norway and Sweden were concerned for three years (7 & 8 W. III, c. 22) to get in naval stores.

The policy of the acts was attacked as tending to increase prices and limit trade. But the answer always was «that this kingdom is an island the defence whereof hath always been our shipping and seamen,» and that therefore «profit and power ought jointly to be considered,» and Child, who thus anticipated Adam Smith in his doctrine that defence is more than opulence, added «I think none can deny that the Act of Navigation hath and doth occasion building and employing three times the number of ships and seamen that otherwise we should or would do.» Decker in 1766 referred to it as «that most glorious bulwark of our trade.» ('High Duties,' p. 21). Lord Sheffield called it in 1783 «the guardian of the prosperity of Britain,» and even Adam Smith says «National animosity at that particular time aimed at the very same object which the most deliberate wisdom would have recommended.»

Thus contemporaries seem to have believed that the policy of the Navigation Acts was effecting its object and that it did actually build up the maritime power of Great Britain. To that policy Parliament held steadily till the end of the 18th century.

The result of the acts on the colonial system is also a matter of dispute. They have been unjustly blamed as being the cause of much friction between the colonies and the mother country. Indeed they have been alleged to be one of the primary causes of the loss of the American colonies. It must, however, be remembered that the acts were by no means strictly adhered to in the 17th century either in England or the colonies. Especially was this true in the case of New England where smuggling seems to have attained the dignity of a profession. In 1696 it accordingly became necessary to reorganize the Board of Trade, and Courts of Admiralty were established in the colonies to see to the more stringent enforcement of the law. A period of lax administration, however, began again with Walpole and lasted till the time of the Seven Years' War, when an attempt was once more made to stop evasions. After 1763 the acts were to be worked so as to afford a revenue by which the colonies should contribute part of the cost of their own defence. Before that year the acts do not seem to have inflicted any great hardship on the colonists, and the commercial monopoly the statutes sought to enforce was scarcely resented. «Whenever the act pressed hard many individuals indeed evaded it,» was

Burke's dictum, and this was certainly true as regards the trade between New England and the French West Indies and Newfoundland. The colonists obtained from those places the French manufactures which according to law they were bound to get from England, but no serious attempt seems to have been made previous to 1763 to stop this illegal trade.

Again, the bringing of the "enumerated" commodities to England involved no very great hardship. England was the natural market for those goods, she being best able to undertake the distributing business in Europe with her old established connections. Where the "enumerations" worked hardly they could be relaxed, as was done in the case of rice in 1730. Moreover, in return for the restrictions thus imposed bounties were given to the colonists on the production of naval stores and copper. The growth of tobacco was put down in England so as to give the colonists a monopoly of the market. Another compensation was afforded to the colonies in the great development of shipbuilding and the carrying trade due to the protection given by the acts to colonial shipping. Massachusetts not merely sold ships in Europe, but in England itself. The causes of the loss of the larger part of the first English Empire do not lie in the trade policy of the Navigation Acts.

In the 18th century the Dutch were outdistanced and England at last attained the position at which she had aimed of being the great carrier of the world. There is, however, no evidence to prove that the Dutch were injured vitally by the English Navigation Acts. The English colonial trade even at the end of the 17th century was only a small trade in the aggregate, and could not have been any very great loss to Holland at the time. The ultimate loss to the Dutch was no doubt great, since they were shut out of a branch of commerce which was capable of great development. The Dutch decline did not begin till 75 years after the passing of the act of 1651. It was the increase in the volume of English trade while the Dutch trade remained stationary that raised England to the predominant mercantile position.

Between 1796 and 1822 many minor relations of the Navigation Acts were placed upon the statute book. Between 1822 and 1826 England's policy was materially changed. Reciprocity in matters of navigation took the place of monopoly. This involved also an alteration in the relations between the colonies and the mother country. To retain for the mother country the bulk of the colonial trade a system of preferential duties was established within the empire. Between 1849 and 1854 the restrictions on foreign shipping and the colonial trade which were embodied in the Navigation Acts were wholly swept away owing mainly to the adoption of free trade.

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25. BRITISH SHIPPING. To an island people, and especially to a nation which has necessarily to import four-fifths of the wheat it consumes, and fully one-half of the total amount of its food from countries beyond the sea, a large and efficient mercantile marine is a vital need. To such a nation, from a national point of view, the shipping and shipbuilding trades must be the most important of all trades.

At the present time the shipping trade is not only the most necessary, but in point of magnitude, it is the greatest of British trades. It is impossible to state with precise accuracy its total volume in terms of money, but a careful and cautious calculation estimated the earnings of British ships in international trades, for the carriage of cargo alone, $450,000,000 per annum. If to this sum be added the earnings of the passenger and mail services, and of the coasting vessels at home and abroad owned and controlled by British subjects, the total, in the opinion of those best qualified to judge of the question, cannot be less than $600,000,000 — an amount greatly exceeding the entire product of the largest British manufacture, that of cotton, which is estimated at $450,000,000, and is about equal to the total gross revenue of all the British railways. Deducting a small percentage for the port dues and charges of the ships in foreign ports, the whole of this sum is distributed among British industries. Unlike the cotton manufacturer who must pay away half his total receipts for his imported raw material, the British ship and her engines are built of British materials in British shipbuilding yards, the officers, engineers, and more than four-fifths of the sailors are British subjects; the vessel is repaired and provisioned in British ports, is coaled at home, and generally abroad with British coal, and insured by British underwriters. It will be seen that British shipping is emphatically a national industry. About one man in 36 of the population is directly employed in some capacity upon the sea, but those indirectly employed in the trades ancillary to, and created by, the shipping industry are many times greater.

The latest pre-war returns issued by the board of trade, those of 1914, give the total tonnage of the merchant vessels registered under the British flag as 14,168,274 tons net register, of which 12,415,204 tons belonged to the United Kingdom, and 1,753,070 to the self-governing colonies and other British possessions. Of the British tonnage, 12,403,231 tons consisted of steamships, and 1,765,043 tons of sailing vessels, that is to say 93 per cent of the tonnage of the shipping of the United Kingdom is that of steamships. The number of vessels (1913–14) registered in British ports was 39,592. These figures are calculated in "net" tons; the "gross" tonnage of British shipping was over 20 millions before the war. It is impossible correctly to appreciate the value of these figures except by comparison with those relating to other nations. A mere statement of total tonnage, however, is an incomplete statement of relative commercial efficiency. The best authorities calculate three tons of sail as being equal to one ton of steam, the latter at the low speed of 10 knots per hour. Whereas 93 per cent of the tonnage of British shipping is that of steamers, about one-third of that of other countries consist of sailing vessels. Further, an analysis of the character and speed of the relative fleets gives still further proof of the superiority of the British marine. A high shipping authority, the editor of the *Shipping World* (of London). after long and careful research made and published as accurate and impartial an estimate as it is possible to make of the comparative efficiency of the British and foreign mercantile fleets. Taking a 10-knot steamer as a unit, and adding and deducting from tonnage in proportion to the departure from this standard of speed, to obtain the potential carrying power, he finds that the potential carrying power of British shipping in 1905 was represented by the figures 16,445,000 against 13,061,000 for that of all other countries combined; while, if steam tonnage alone is taken, the figures for potential efficiency for the United Kingdom, and all other countries taken together, were 15,834,000 and 11,555,000 respectively. In 1917, according to the same authority, about half the *ocean-going* ships of the entire world were sailing under the British flag.

The British demand for new ships is entirely supplied by the shipbuilding establishments of the country, which in addition have built for other nations during the five years 1910–14 inclusive, an annual average of about 1,027,755 tons, exclusive of ships of war. The mercantile fleets of other nations also consist, to a considerable extent, of the vessels discarded and sold by the British shipowners.

To this remarkable concentration of a great trade, one of a specially international character, and one greatly desired by all, in the hands of one nation, many causes have contributed. History shows that it cannot be attributed to commanding geographical advantage in the position of the British Islands, nor to any supreme aptitude of the British people for the life of the sea, and for conducting the oversea trade of the world. In the art and the science of shipbuilding the French have always been well to the front. In the Napoleonic wars Nelson's best ships were those he had captured of French build. In our own time the French have more than once given a lead in naval construction; the first armored ship was French; it was the French who introduced the water-tube boilers, and constructed the first submarines. The coasts of Normandy and Brittany have always furnished hardy and courageous sailors and fishermen, and yet to-day France stands low in the scale of mercantile maritime powers, notwithstanding the heavy subsidies she pays to her shipbuilders and shipowners. America contests with Great Britain the honor of successfully applying steam to navigation. Fulton's experimental boat in 1798 was four years earlier than Symington's *Clermont* on the Forth and Clyde canal. The *Savannah* in 1819 was the first vessel with auxiliary steam to cross the Atlantic. Both in the construction of sailing ships and in the improvement of the early marine engine America led. The supremacy of the British mercantile marine, therefore, cannot be attributed to the possession of superior inventiveness or aptitude of the British men for the command of the sea. The phenomenon itself is a very modern phenomenon. "It may be assumed," says Mr. Cunningham, an authority on economic history, "that in the Middle Ages the shipping of the Italian Republics and the Hanse League excelled that of England." The chance of England did not come in fact until the discoveries of Columbus and Vasco da Gama opened the western and eastern oceans to commerce, which, until that time, had been confined principally to the Mediterranean and other inland seas. In later times we find that Spain and Portugal, and afterward Holland, took the lead in the new ocean traffic, so much so that in 1603 Sir Walter Raleigh wrote, "The merchant ships of England are not to be compared with those of the Dutch." The English position, however, was improving, and in 1666 Sir Henry Petty estimated that the Dutch shipping tonnage amounted to 900,000 tons, English to 500,000, French to 100,000, Hamburg, Dantzig, Denmark and Sweden to 250,000 and Spain, Portugal and Italy to 250,000. At this time English shipping was subject to the celebrated Navigation Act of Oliver Cromwell (1651), the principle of which, broadly speaking, was to confine foreign trade with European countries to the vessels of Great Britain or of the country with which the trade was carried on; and all trade with any of the more distant continents, or with any of the plantations of Great Britain, entirely to British ships. The Navigation Laws of other maritime nations were framed in a similar spirit on similar lines. In the international race all competitors were pretty equally privileged or handicapped. Although the whole system had become riddled with exceptions and exemptions and suspensions, due sometimes to necessity, and sometimes to reciprocal treaties, the principle of the legislation of Cromwell remained in force until the Navigation Acts were finally repealed in 1849. The great expansion of the trade of the world in the first half of the 19th century together with the improvement in the size, speed and cost of building and operating the new steam fleets, had rendered it generally impossible to maintain the mediæval system of the old Navigation Laws, and although other nations did not, like Great Britain, emancipate themselves from these fetters at a stroke, they have found it impossible to maintain them, and the relics of the ancient system survive in the present day chiefly in the form of the reservation of their coasting trades by many, though not all of the civilized nations of the world; certain restrictions on their colonial trades, and in addition to this, in the case of the United States, the restriction of the privilege of the American register, with its exclusive right to the coasting trade, to ships built in America of American materials. The mediæval system in its old barbarous form has universally passed away, and for more than half a century Great Britain has carried on her oversea trade in the atmosphere of free competition.

In all the previous centuries she possessed no marked superiority as a shipowning and seafaring community, and at the time of the Free Trade revolution (1846) she might only with some doubt be placed first among the mercantile maritime powers. She was then making no marked progress in comparison with other nations, and in some respects was declining. For example, although after the great war in 1815 the shipping tonnage of the United States was not half that of the United Kingdom, in 1850 the American mercantile marine had grown to be very nearly equal to that of England in total tonnage, if coast and lake and river steamers be included, and greatly exceeded it in efficiency, for it included more than half a million tons of steam shipping against less than 200,000 tons of British shipping of the same class. Although the tonnage of all American ships registered for oversea (foreign) trade was at that time only about one-third of that of Great Britain, it was superior in quality, and was increasing with greater rapidity. The Americans excelled in the speed, efficiency, and beauty of their sailing ships, and the celebrated «Baltimore Clippers» and «American Liners» almost monopolized the carrying trade between Great Britain and the United States. In the middle of the 19th century it may be said that Great Britain and the United States were worthy and well-matched rivals in the race for leadership upon the ocean.

It is an interesting question to ask what are the causes to which this modern phenomenon, the supremacy of Great Britain in the trades of building, manning, and operating ships, is to be attributed; and especially those which have led to the decline in the mercantile marine of the United States registered for foreign trade, almost to the point of extinction. It would be erroneous to attribute this commercial revolution to any one cause. The substitution of steam for sailing ships does does not appear to have been of any particular advantage to Great Britain, for during the first 30 years of the existence of sea-going steamships America kept the lead in this class of shipping, and her engineers contributed largely to the earlier development of the marine engine. The later substitution of iron and steel for wood as the material for the construction of ships undoubtedly gave a great temporary advantage to England, which was at that time and remained for many years the largest and cheapest producing country of iron and steel, but it does not explain the fact that while the production of iron and steel in America now greatly exceeds that of the United Kingdom, this country has not been able to regain any considerable portion of the trade of building and operating ships for international commerce. Undoubtedly the American war had a disastrous temporary effect upon American shipping, shown by the decrease in the tonnage of ships registered for oversea trade from 2,546,237 tons in 1860 to 1,516,800 tons in 1870. The principal explanation of this phenomenon is undoubtedly to be found in the opposite fiscal policies pursued by the two countries. It would not be proper in this place to enter into an argument as to the general results of the British policy of free trade, and the American policy of protection upon the two countries, but it is a fact admitted alike by freetraders and protectionists, that the control of this particular trade of international shipowning and shipbuilding has been determined by their mercantile policy. (See GREAT BRITAIN — FREE TRADE). The growth of the shipping supremacy of Great Britain, a supremacy becoming more marked each year, dates from the adoption of the policy of free imports in the years 1840-50, coupled with the abolition of the Navigation Laws in 1849. The process of the absorption of international shipping by British shipowners has undoubtedly been assisted by the protection policy of other nations. By restricting their importation of British material goods, the inexorable economic law which compels each trading nation to pay its debts and balance its international accounts, has rendered it more convenient for Great Britain to pay for her great imports of food and raw material to the nations which refused her cotton goods or her iron, in the form of shipping services, which form at the present time the largest of British exports. The result has been that while the total volume of British trade amounts to not more than one-seventh of the trade of the world, British ships carry about one-half of the trade of the world. The volume of purely foreign trade, that is of trade between foreign port and foreign port — trade which does not touch the ports of the United Kingdom, carried by British ships — largely exceeds that of the direct trade to and from British ports. In contrast, the gradual decline of the American trade is well set out in a statistical table prepared by Mr. Meikle, Secretary of the Seattle Chamber of Commerce, and published in the report of the Merchant Marine Commission at Washington in 1905. It showed that in the year 1821 the percentage of the import and export trade of the United States carried in American bottoms was 88.7. This proportion, which remained fairly steady until 1850, had shrunk in 1860 to 72.5 per cent. From that year onward the decline became increasingly rapid until in 1900 the percentage carried in American bottoms was only 9.2. In 1914 British shipping employed 295,652 men and boys. Of these 212,640 were British, 31,396 foreigners and 51,616 Lascars. Of the foreign tonnage (61,429,000 tons) entered and cleared at British ports in 1914, Germany had nearly 11,000,000; France, 4,759,000; Russia, 1,675,000; United States, 1,548,000 and Japan, 682,000.

The total loss of merchant shipping to the United Kingdom from the outbreak of war to 31 Aug. 1918 was 8,761,368 gross tons, of which 4,544,195 gross tons were replaced by new construction during the same period, making a net loss of 4,217,173 gross tons — about one-fifth of the British mercantile marine. Shipping captured from the enemy amounted to about 800,000 tons.

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26. BRITISH RAILWAYS. Comparisons and Contrasts Between the Railway Systems of Great Britain and the United States.— "The plastic American instinct has introduced the wholesale principle into regions where the slower-witted nations of Europe have never thought of applying it. The factory life of England is new and British manufacturers fully appreciate the economies to be effected by turning out pins by the million gross, cotton yarn by the million pounds, and steel rails by the tens of thousands of tons. But the Americans have applied the principle to businesses which have existed since the dawn of civilization. Their hotel-keeping is wholesale; their farming is wholesale; and, most of all, their transportation system is wholesale. The English farmer still looks upon the railway train as only a slightly magnified carrier's cart, and persists in sending his basket of eggs or his hamper of vegetables to market, as his grandfather did when George III was king. The American farmer does his business in carloads."[*]

The writer, in a book written by him 27 years ago, after his first visit to the United States, pointed out in these words what seemed to him then, as it seems to him now, the essential differentia between English and American railroading, and suggested that the difference is not accidental and specific, but part of the generic difference between the two countries which naturally arises from their different historical and geographical position.

But there are other important differences between the railways of England and the United States. England is an island, and a small one; America is a great continent. The maximum possible haul within the British Isles is just about as far as from New York to Chicago. In fact there is practically no traffic here requiring to be carried any such distance. If it did, it would probably go by water, for there is no place in Great Britain more than 80 miles from a sea port. Anything over 100 miles is referred to in England as a long haul; in the United States the average haul of freight is 156 miles. the average passenger journey in the United States is 33 miles; in Great Britain it is probably — accurate statistics do not exist — about 10 miles.

Again, Great Britain is densely populated; the United States is the reverse. On one twenty-fifth of the area of the United States, England has half as much population. Naturally, therefore, while the United States has fewer miles of railway per square mile of area, Great Britain has fewer miles per thousand of the population. Roughly, the United States has eight and one-half miles of railways per 100 square miles of area; Great Britain has over 19 miles. But in Great Britain there is a mile of line for every 2,000 of the population; in the United States a mile of line for every 400. The population of Great Britain and, therefore, its intercourse, per mile being so much greater, it is also natural that a mile of railway is a much more elaborate thing than in the United States. For every route mile in the United States there are one and one-half miles of track, while in Great Britain there are nearly two and one-half miles. In equipment the contrast is even greater. With only one-tenth of the mileage of railways in the United States, Great Britain has nearly two-fifths the number of locomotives, half as many more passenger cars, and nearly as many more freight cars.[*] Put another way, a mile of English railway represents an expenditure of almost as many pounds as a mile of American railway represents dollars; a mile of English line earns gross two dollars for every dollar that an American mile earns and earns net in the ratio of three to one. In Great Britain the railway occupies in great measure the place of the street car of the United States, and is the means by which large sections of the population move daily to and from their work. And whereas the typical freight consignment in the United States is a "straight" carload of produce carried for a long distance, the typical consignment in Great Britain is a single box, or bag, or bale, or other package of manufactured articles, carried from one town to another closely adjacent.

The service required of the railways by the public of the two countries being so entirely different, it is only natural that the method of performing it, and the charges made for it should show equally wide differences. In the United States the railways receive three cents per mile on the average for every passenger, and at this rate find passenger traffic barely profitable. In Great Britain the railways receive hardly, if at all, more than one cent a mile on the average. Yet they can make a handsome profit, despite the fact that they give a much more frequent and a faster service, with accommodation certainly not inferior in comfort. The mainstay of railway prosperity in the United States is in the carriage of freight at a rate of, roughly, four miles for three cents. English companies' receipts average, it is estimated, not less than two cents for each mile. Yet the prevailing opinion of those best qualified to judge is that much of the freight traffic in Great Britain is unprofitable, while not a little is done at an actual loss — for the irony of fate has decreed that England, with freight rates undoubtedly on the average the highest in the world, shall also have certain rates undoubtedly the lowest. For instance, for eight cents the Great Eastern Railway Company will bring from any of its country stations, say between 50 and 130 miles off, and deliver to the consumer's door in London a box of farm or garden produce of a gross weight of 20 lbs.

On the outbreak of the war the government took over the railways of the country. The latest available statistics (1915) show a total of 40,808 miles of running lines, made up of 23,709 miles single-track; 13,403 miles double-track; 1,648 miles three-track; 1,277 miles four-track and 706 miles more than four-track. The train miles run numbered 273,659,000 passenger, 156,007,000 freight and 666,000 mixed. Including switching (shunting) operations, a total of 621,239,000 engine miles were recorded for the year. Total number of passengers carried, 1,591,146,000; freight tonnage, 568,201,000.

Similarity.— England and the United States are the only great countries where the railway system has been provided by practically unaided private enterprise, and still remains wholly in the hands of practically independent private companies. In both countries the state has found it necessary to interfere at many points, and an interesting essay might be written comparing the methods of government control adopted in each. But here it can only be very briefly pointed out that in both countries the Anglo-Saxon tradition prevailed, and such governmental control as existed took in the main a legislative and judicial form. Executive interference — which in France descends to the minutest details of every-day operation — is in England still of relatively small importance. Till recently, however, it was safe to say that English railways were and always had been more closely supervised by public authority than the railways of the United States. That is no longer true. Such scant powers of interference as our executive authority, the Board of Trade, possesses to-day, it has substantially possessed from the outset. And there is not much serious public demand for further interference.

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[*] 'The Railways and the Traders.' (London 1891).

[*] Of course in Great Britain the locomotives and cars are smaller and freight cars only one-third of the size of those of the United States. The comparison includes coal cars privately owned (believed to be not less than 700,000 in number which are ignored in English official statistics.

Laws Governing the Railway Systems.— According to the English code of railway law, which took practically its present shape as long ago in 1845, no company can come into existence, no new line can be constructed, no new capital can be raised without the authority of a special Act of Parliament, which lays down in great detail the constitution of the company, the exact route of the line and its method of construction, the amount of the capital and the purposes to which it shall be applied. Maximum rates and fares for goods and passengers are also prescribed. The authorized railway cannot be opened for passenger traffic until an inspection by public authority has secured that every possible precaution for safety has been taken. Once opened, however, the operation of the company is in the main in its own hands. There is, however, one very important point where the state interferes. Whenever an accident happens an expert official of the Board of Trade holds an exhaustive inquiry. He has no power except to inquire and to recommend. But his report is published, and in normal cases the companies are very ready to fall in with it. If they unreasonably fail or neglect to do so, public opinion soon converts the recommendation into a command. It is the simple truth to say that under this system the English railways have been on the whole over a long series of years the safest in the world. Better proof could hardly be sought of what Mr. Charles Francis Adams calls "The eventual supremacy of an enlightened public opinion." On the side of commercial management such control as exists is in the main judicial. A special court, the Railway Commission, exists to watch over the observance of the law of undue preference. Its powers are, it is true, seldom invoked, but that is the best proof of their real efficacy. Further, the same tribunal has power to forbid the increase of any existing rate for goods, and does in fact refuse to permit any such increase unless under exceptional circumstances. There is no popular prejudice in England against pooling. Our railways constantly enter into pools or, as we call them, traffic agreements. In some cases even one company is paid by another a sum of money annually on condition it does not compete for certain traffic. Sometimes these agreements are specially sanctioned by Parliament, sometimes they are made by the companies under the general powers and sometimes they are submitted for approval to the Railway Commission. See RAILWAY CONSOLIDATION, ENGLAND.

Finance.— The capital of each company is regulated in detail by Parliament. It is an almost invariable rule that not more than one-fourth of the total shall be borrowed money, which you call loans and we call debentures. Railway debentures are consequently among the safest of investments and sell at a price only a very little below that of consols. Of the share capital usually from one-third to one-half is in the shape of non-cumulative preference shares bearing a fixed rate of interest. The remainder is ordinary stock. But ordinary stock in England, where traffic varies little from year to year, and where railways are complete and finished before they are first opened for traffic, pays an almost unchanging dividend from year to year, averaging about 4¼ per cent. And preference shares accordingly are regarded as practically nearly as safe as debentures. Railway stocks of all kinds, debentures, preference or ordinary, were till about 17 years ago the most favorite investment for the savings of the bulk of the people. Since the beginning of this century there has been a marked change. This is partly due to an external cause — the increased value of money in the market — but much more is it due to internal causes. Constant pressure for lower rates and improved service by the public, constant demands for higher wages are made in England, as in all other countries. But there is more than this. For a long period, while American railways were ploughing their earnings wholesale into the road and Continental railways were forming sinking funds or paying off terminable annuities, English railways were thriftlessly financed. They divided up to the hilt, formed no reserves and charged every betterment to capital. Of recent years there has been a great change for the better. Property is being improved out of income, reserves are growing. But meanwhile the shareholders are paying, in reduced dividends and still more in reduced salable value, for the financial errors of the past. Stocks of some of our great companies, which 20 years ago stood at or near 200 can to-day be bought at about par. And yet meanwhile the dividends will have only fallen from 7 per cent to 6 per cent or from 6 per cent to 5½ per cent. The former price was undoubtedly too high. The present price is probably too low and at the time of writing recovery seems overdue.

The total paid-up capital of the companies at the end of 1914 was £1,334,011,000 ($6,670,055,000), of which about 15 per cent represents nominal additions due to consolidation, conversion or division of stocks.

One other point of contact between England and the United States may be noted in conclusion. Between them they are responsible for the original invention of railways, and for every important improvement in railway methods and practice that has been introduced since. There are some students of railroad history who, spite of the fact that the nations of continental Europe are more and more going over to national ownership of railways, believe that this is no accident, but rather a natural result of the Anglo-Saxon habit of leaving to private enterprise the utmost freedom which practical experience shows to be compatible with the welfare of the nation at large.

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27. THE ENGLISH LAND LAW.

Sources and General Characteristics.— The law of land, or "real estate" bears the traces of the different streams of influence that have made English history. It derives its main characteristics from the feudal organization of society, but these characteristics have been superimposed on other systems, or combined with other elements, which may be of early Germanic, Celtic, or in some instances even of Roman origin. Again, the land laws have been the subject of frequent legislation; in the usual English method particular evils have from time to time been remedied without any logical recasting of the body of the law, and without the removal of mere anomalies which could not rank as grievances. But the main principle of the law may still be called feudal.

The modern law may be compared to a chalk cliff in which are many fossils; a cliff pierced by works and tunnels for such useful purposes as railways or mines, but left, where modern necessities have not interfered, to the slow decomposing action of the elements. The chalk is the feudalized common law, the fossils are pre-feudal survivals, such as land of "copyhold" tenure, the works and tunnels are Parliamentary statutes and the elements are the forces of public opinion acting by judicial exposition and construction. Compared to the law as it was in the early years of the 19th century, the modern law of real property is simple, but if it be tested by any more severe standard it still retains many intricacies for which it is easier to find a historical than a logical explanation.

Land on feudal principles is the subject of tenure and not ownership. No man owns English land unless he be King of England. Land is always "held of" some one — either the King, or a tenant in some degree of the King. Land was thus originally looked on rather as the means of fulfilling a duty than as so much property, and for the comparatively simple conception of ownership was substituted the more subtle idea of "estates," i.e., parts of and interests in ownership. Some of these interests were not recognized in the courts of common law but only in "equity," i.e., the extraordinary jurisdiction of the Chancellor. In time the feudal idea of tenure ceased to express the real state of things, and a tenant in fee simple became and has for many centuries been an absolute owner. But the inherited complications remained and indeed grew, being constantly developed so as to evade and even counteract Parliamentary statutes which landowners and the legal profession viewed with disfavor. In 1832 the English land law was a vast metaphysical system requiring and developing great acuteness of intellect among practitioners but utterly unintelligible to a layman.

The feudal theory of tenure gave to English land holding a certain social character which in many country districts has never been lost. To this day land in rural England is looked on less as a means of livelihood or source of income than as giving a certain social status to which rights and obligations are attached. Indeed it would be difficult even now to give a better definition according to received ideas of the English upper social class than to say that it consists of the owners of the country estates of England.

The legal position of the possessor of land may be considered in three main aspects; his relations to his predecessors and successors, including what may be called family law; his economic and social relations, including the law of landlord and tenant; and his relations to the community as a whole including his liability to taxation and generally the rights and powers of the State.

Family Law; (1) Settled Land.— England is a country of large properties, and most large properties are, to use a legal phrase, "Settled Land." The meaning of this is that by the terms of some deed or will (called for this purpose "a settlement") the land is not at the disposition of a living person to sell, mortgage or give away; the apparent owner is only what is called a "tenant for life," and on his death the land will pass to some other person, generally his eldest son, if he has children, but if he has not, then to some collateral relative, without any effort and without any power of interference on his part. A "settlement" of this kind may be looked on as a temporary and conventional "entail"; it originates in the voluntary act of some tenant in fee simple and its duration is limited by law to the life or lives of some person or persons in being when the settlement is made and a further period of 21 years afterward. The practical effect of an ordinary English settlement is to preserve the land for two or even three generations to the eldest living male of the senior line as head of the family to the exclusion of females and younger sons. In most land-holding families as soon as the person who will succeed to the land not merely as a life tenant but with absolute power of disposition, is next in succession and is 21 years of age, he joins with the existing tenant for life — usually his own father — to resettle the land for another two generations. Thus one settlement succeeds another and a tenant in fee simple is rarely, if ever, in possession. Provision is usually made for a widow of a tenant for life by giving her an annuity known as a "jointure," and younger children are given comparatively small sums of capital known as "portions" which are made charges on the estate. The practice of settlement is permitted but not enjoined by the law; it came into fashion about the middle of the 17th century. It is thought by some observers that the practice now shows some signs of being on the wane, but no direct evidence is available;

certainly it still affects nearly all large properties, and therefore the greater part of English land. Its result has been to make each eldest son in turn the proprietor of one or more family estates, to prevent the dispersal of land into many hands and to keep for the head of a family a social prestige and pre-eminence among both relations and neighbors. If there happens to be a peerage or baronetcy in the family, the land practically always goes with the title. In fact it is not uncommon even in cases where there is no title or honor in the family for the settlement to provide that any person succeeding who does not already bear the family name — e.g., a married daughter, or a daughter's son — shall take the name and armorial bearings of the author of the settlement on pain of exclusion from the property. Younger sons, on the other hand, after a boyhood spent on the family property are left with slender portions to make their own careers; thus in their case class distinctions tend to be obliterated; younger sons of the land-holding class may be found in almosf every branch of activity, in the navy, the army, in orders in the Anglican Church, in commerce and in the learned professions.

British colonial development owes much to the adventurous disposition fostered by the outdoor life and the economic necessities of the younger sons of the land-holding classes.

Formerly the main economic objection to the legal fetters imposed on land-holders by settlements, was that during a settlement the land was taken out of commerce as it had no proprietor who could sell. This difficulty has now been removed as the result of an important act of Parliament (The Settled Land Act 1882). Every English tenant for life may now be considered as a kind of plenipotentiary agent for the whole family, born and unborn. Subject to certain not onerous restrictions, he can sell or lease for long periods on the recognized terms as he pleases, indeed he can do almost anything which a prudent and honest owner would do, but always on the terms that the property or the proceeds of sale are kept to descend in due course of settlement. But the real fetters on an English tenant for life are not those which the law imposes, but the fetters of tradition and family sentiment which no legal power or ingenuity can remove.

(2) Lands Not Settled.— Apart from this liberty of terminable settlement the English law does not favor restrictions on the powers of a landholder. No entail can by English law be created which cannot be destroyed as soon as some persons unborn at the date of its creation attains 21 years of age. In the 15th century English lawyers, more daring than their Scottish brethren, with public feeling behind them, went so far as in substance to defeat the provisions of a Statute of Edward I (*De Donis Conditionalibus*, (A.D. 1285), by which Parliament had sought to make entails perpetual. Where land is not settled, in the case of the death of a landholder without a will, the common law on feudal principles gives his land to his eldest son; pre-feudal customs are, however, not left entirely without witnesses; in parts of the county of Kent the older custom of equal division, known as gavel-kind, still prevails, and in a few ancient boroughs under the custom known as «Borough English» the youngest son alone succeeds. But cases of intestacy are not common among the wealthy classes.

Wills.— A tenant in fee simple has, contrary to feudal principles, been gradually empowered by successive acts of Parliament, culminating in the year 1662, to dispose of his land by will after his death in the same absolute manner as during his life. He can disinherit totally or partially all or any of his children and can at his pleasure give the land to strangers or, since the year 1891, even to charity. But the charity as a rule is bound to sell the land and not retain it.

Landlord and Tenant. (1) The Town.— There is a sharp contrast between the land system in the towns and in the country. In and near towns the proportion of settled to unsettled land is probably smaller than in the country; but even in the case of settled land the tie between landlord and tenant is purely economic. A town landlord may often be of inferior social standing to his tenant; further, urban and suburban land is often owned by commercial companies formed for dealings in land. But both in town and country, England is a land of large properties and it is the exception to find that the actual occupier of land is, in the popular phrase, «his own landlord.»

On all land in or near towns, building is usually done on the lease-hold system. By this system the land is let, usually to a builder, for a long period, from 80 to 99 years. The lessee contracts to build and keep his building in repair; to pay an annual «ground rent»; to discharge all taxes levied on the land, and in fact to bear all possible burdens connected with it. At the end of the lease the land and the building on it revert to the successors of the original landlord. The long lease thus granted may usually be sold or mortgaged at the pleasure of the lessee, and the building itself is frequently sublet by the lessee as landlord to the actual occupant as tenant, who pays to the original lessee or his successor a full or «rack» rent for building and land together.

Until recent years the whole tendency of the law was to favor the landlord as against the tenant, and even now the law can hardly be said not to lean in the landlord's favor, particularly in allowing him the right of distress for rent. In the exercise of this right, contrary to the general principles of English law, a landlord whose rent is in arrear can without the judgment of any court seize and sell any chattels of any person, whether his tenant or a stranger, that he can find on the premises, and thus pay himself his rent. Recent legislation (The Conveyancing and Law of Property Act 1881) has, however, interfered against the landlord, who, whatever the terms of the lease, can now no longer forfeit a lease for a casual breach of covenant not deliberately persisted in by the tenant.

This leasehold system in and near towns, though frequent, is not by any means universal, especially in the north of England; there, a common plan is to sell land for building purposes out and out, in consideration of a perpetual rent reserved to the vendor. Further, the simple plan of the sale of building plots for a lump sum is probably growing in favor, particularly in suburban districts developed by land companies. A company of this kind has no family pride in the preservation of its estate, nor does it wish to realize an improved value after three generations.

(2) Country.— In the country districts the long leasehold system is unknown. The ordinary English farmer usually does not hold a lease for any fixed term of years, but has merely a tenancy from year to year determinable by 12 months' notice. As a rule all the farm buildings have been supplied by the landlord. The tendency of modern legislation is to give the agricultural tenant security for the value of his improvements, but the old law, which treats whatever is built or planted on land as an accretion to the land, and therefore the property of the landlord, still governs to a large extent the relationship of landlord and tenant.

The tie of landlord and tenant in the country districts is, for good and for evil, not merely economic. The landlords are the social magnates of the countryside. As unpaid magistrates they have had up till within recent years practically a monopoly of the ordinary dispensation of all minor criminal and some civil justice. On the other hand, in bad years they are expected by the common opinion of the countryside to allow and do allow considerable reductions on the agreed rent. A "good landlord" is the man who is always ready to aid his tenants in sundry ways. On well-managed estates, the system works easily. The system, however, is one which for its success depends on the peculiar social conditions which have hitherto prevailed in rural England, and its transplantation to Ireland, where these conditions did not exist, had results disastrous for both countries.

Sporting Rights.— In England the love of sport has been a prominent characteristic of the landholding class throughout all history; it is practically the universal custom for a landlord to reserve the sporting rights over agricultural land. If he does not exercise them himself, he lets them to some other person. Where sporting rights are reserved the tenant has no right to kill pheasants or partridges, but the Ground Game Act of 1880 empowers the tenant himself, and one other person authorized by him in writing, to shoot hares and rabbits on his land whether sporting rights are reserved or not, and whatever the terms of the tenancy agreement.

Land and the State; Taxation.— The taxation of land is a question that is complicated by some historical anomalies. (1) *Land Tax.* — The burden commonly known as Land Tax represents historically the surviving portion of a general tax in the nature of an income tax imposed both on real and personal estate in the year 1692; but it has for many years been a mere stereotyped incumbrance redeemable by the landholder, and charged on the value of the land as in the year 1692. On most urban land the tax has been redeemed. The Finance Act of 1909–10 (introduced in 1909) effected a revolution in land taxation and provided for (1) Duty of 20 per cent on unearned increment accruing from land; (2) reversion duty of 10 per cent on value of benefit accruing to a lessor on determination of any lease of land; (3) an "undeveloped land" duty of a halfpenny per £ on site value of land not built on or used for any industry other than agriculture (payable by owner); (4) mineral rights duty of 5 per cent on rental value of rights to work minerals and all mineral wayleaves. (2) *Income Tax.*— Incomes derived from land, i.e., the net rent of land, are liable to income tax equally with incomes derived from other sources. (3) *Death Duties.*— Before 1894 land escaped the greater part of the death duties imposed on personal property, but since the Finance Act of that year all species of property are in this respect on an equality. (4) *Local Taxation.*— On the other hand a man's liability to local, as distinct from imperial, taxation is estimated by the value of the real property (i.e., land and buildings) which he occupies, no account (in spite of some earlier statutory provisions to the contrary) being taken of his personal property. On agricultural land, by an act of Parliament passed in 1896, only half the ordinary rate is paid. But no contribution is made to local taxation in respect of the capital value of land, or of land which is not occupied, however high may be its value. As a war measure the Budget for 1918–19 introduced a considerable increase in both direct and indirect taxation.

Other Rights of the State.— The feudal principle of the ultimate ownership of the King has produced little or no effect in giving to the state which the King personifies, rights over English land. The modern state has practically no mineral rights. The precious metals, gold and silver, which for commercial purposes are practically not found in Great Britain, are in law crown property and can only be worked under license from the crown. But all other minerals belong to the tenant in fee simple of the soil who leases or works them for his own private benefit. The crown lands in England are small in extent; ownership by local authorities is still in its infancy. There is no prairie land to grant to railway pioneers or new settlers. When land is wanted for the purpose of some undertaking of a public nature — such as a railway, waterworks or the site of a post office — it has, as a rule, to be purchased by the company, or authority concerned, under statutory machinery, by which the fair value of the land has to be paid, plus 10 per cent compensation for compulsory sale. In the year 1887 the principle of compulsory acquisition was, subject to many safeguards, extended to the acquisition by a local authority of land to be let in very small quantities, called allotments, to agricultural laborers or others for cultivation. The Irish Land Purchase Act of 1903 proceeded on the principle of a loan by the state to a tenant who wished to purchase his holding from his landlord, and agreed with him as to the price. It did not directly involve either public ownership or compulsory acquisition.

Transfer.— In recent years several attempts, culminating in the Land Transfer Act 1897, have been made to induce English landholders to abandon the present system of private transfer of land for a system based on a Land Registry. Under the present system whenever land is sold or mortgaged, it is necessary for the purchaser or mortgagee to satisfy himself as to the title by going into all dealings with the land for a period which may be as long as 40 years. This is an expensive process, but it has been endeared by centuries of experience to English landholders and lawyers. At the present time, a public Land Registry has been substituted for the old system only in London. The principle of the new system is to enter the name of the proprietor of (or rather the person entitled to sell) every piece of land on a register and to make land transferable by the person registered by means of a fresh entry on the registry, as if it were so much stock in the funds. The extension of this system to the rest of the country is a question of time; but in legal matters time moves slowly.

Trend of the Law.— Recent developments of the law have in nearly all cases tended to restrict the freedom of the individuals in relation to land. Neither in town nor country are landlord and tenant allowed to make what bargain they choose; it is assumed that the economic inferiority of the tenant places him at too great a disadvantage for it to be possible for him to make a contract fair to himself, and so beneficial to the community. Men are no longer allowed to settle their land in such a way as to make it unsalable, and the community has asserted the right to dispossess the individual, not only for definite works of a public nature, but in order to provide its poorer members with an interest in the land. It has also compelled land owners in the Metropolis to abandon the old system of private conveyance and mortgage for a system which is in a sense public, as it is worked by public officials, and which may thus be regarded as a kind of reversion to the old method of public transfer. The same system will also in time form a new and more accurate 'Domesday Book'— a purpose which the provision for a complete valuation of all the land in the kingdom as at 30 April 1909, under the Finance Act of 1909–10, was designed to effect. Finally, modern legislation has put an end to the former advantage of land in respect of taxation and so claimed a larger share in real property directly for the state. The simplification of the land laws may be said to be one aspect of this change; intricacy and subtlety of phrase and interpretation may be tolerated by a private owner as the price of the liberty of complicated dispositions and of secrecy, but these niceties are inconsistent with the uniformity which must accompany public control.

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28. AGRICULTURE.— THE 18TH CENTURY. Between 1700 and 1815 English agriculture changed its whole character. England became a great wheat exporting country and continued so up to 1773. Great agricultural improvements were carried through, stock breeding became scientific, waste land was broken up, large portions of the fens were drained, big farms with enterprising up-to-date farmers became the object of every landlord and the agricultural system which had come down from Anglo-Saxon days, and which still prevailed over large parts of England, was given up. English farming became intensive in character instead of mainly extensive. The social effects of the change involved the disappearance or degradation of the landowning peasantry or yeoman class. On the other hand it was only by means of the great increase in agricultural produce that England was not starved into submission during the Napoleonic wars. The changes in agriculture of that century meant ultimately nothing more nor less than national independence.

One of the main objects of English policy had been for centuries the encouragement of agriculture. A sufficient food supply raised at home deprived the enemy of the power of cutting off supplies from abroad. Moreover agriculture was considered the best breeding ground of good soldiers. Wheat also was an excellent commodity for ships to carry, and the encouragement of corn export formed part of the Navigation policy of the realm. The great attention bestowed by successive governments upon agriculture was the most original part of English policy. Her seamanship she copied from Holland, her industrial protection from France; but while every other country aimed at preventing the export of corn so as to have a sufficient food supply, England deliberately stimulated export believing that thereby farming would be best encouraged.

This policy reached its most complete expression in the Corn Bounty Act (1 Wm. and Mary, c.12) of 1689, by which, when the price of wheat was at or below 48 shillings (and protionately for other grains) a bounty was given on export.

The result of this law was to attract capital into farming. Men who sunk money in improvements were assured of a price which should not fall below 48 shillings and under the stimulus of this certainty a great agricultural revolution began. There grew up gradually a class of capitalist farmers and “spirited landlords” who were willing to carry out experiments. The result was that by 1770 England not only produced food for a population that had doubled itself, but was the granary of Europe.

One of the great improvements of the 18th century was, for example, the manuring of land, by which Arthur Young calculated that three or four hundred thousand acres of waste were turned into gardens. A revolution in fodder was brought about by the introduction of turnips and clover, while careful attention to grass seeds resulted in good hay on which cattle could be kept in condition in winter. Previous to the introduction of winter roots the majority of the beasts had to be killed in the autumn and salted down, while the remainder declined in weight through sheer starvation. This annual loss was now averted and a supply of fresh meat secured all the year around.

It therefore became worth while to improve the breed of the animals themselves. Bakewell of Dishley and Coke of Holkham wrought a revolution in English life with their Leicester and Southdown sheep and Devon cattle. Animals were now raised primarily for food instead of for their wool or hides, they were ready for the market sooner and the average size of cattle increased considerably. Thus a larger food supply was secured, and the great stockbreeders wrought a change the effects of which were as far reaching as those of Watt and Arkwright.

Before however this scientific farming could become general it had to become known. Roads were undeveloped, people in one county could not know what was passing in another, there was no agricultural newspaper — no machinery to make this knowledge common property. Moreover with the inherent conservatism of the agricultural class it needs something more than mere knowledge to make a farmer change his ways.

The necessary diffusion of information was carried out largely by Arthur Young and the Board of Agriculture, while the stimulus of the great wars and the shortage in the food supply provided a powerful incentive for improvement by means of high prices. Moreover, the growth of the iron and coal trade had led to the cutting of canals, and internal communications of all kinds were improved. People could get about; great towns began to grow up, providing an ever increasing market for food stuffs. It therefore became more and more worth while to effect improvements, and scientific agriculture became a patriotic hobby. The King himself wrote articles for agricultural newspapers and the great agricultural meetings and cattle shows put a spirit of emulation into farmers.

The chief obstacle to betterment lay however in the fact that much of the land was owned by small farmers who simply had not the capital to get good stock, implements, seeds and manures. Moreover, the system of farming among the peasantry was that of farming in strips, each man having about thirty strips of land but no two lying together. These strips were separated from one another by turf balks, and after the hay and corn harvest had been gathered all the animals were turned indiscriminately over the open fields. The system was most wasteful. It was quite impossible to adopt improved methods of cultivation on half acre strips. No winter crops could be grown because the cattle ranged all over the fields from September to February. No improvements in breed could be carried out when good cattle were exposed to the infection of the mangy village herds with their foot and mouth disease. No drainage could be attempted since the outfall would be on some neighbor's strip. The loss of time involved in going from piece to piece, and in carting little bits of hay and corn from different places, to say nothing of the waste of numerous footpaths and the endless disputes over real or fancied encroachments, made the system one which in the interest of good farming it was highly desirable to displace. It was established by the Board of Agriculture that tenants lived comfortably on enclosed land rented at 10s. 6d. ($2.62) an acre who had starved on open farms at 2s. 6d. (62 cents) an acre and that enclosed land at 20s. ($5) an acre was cheaper than open land at 8s. ($2).

The famine years of 1795, 1800 and 1801 made the prosperity of agriculture a pressing national question. Enclosures were pushed on rapidly, partly by the agreement of the parties concerned, but mainly by private Acts of Parliament. The general result was that the scattered strips were given up and each farmer received an equivalent in a compact little holding all in one place.

Between 1770 and 1799, 1,375 enclosure bills were passed, between 1800 and 1819, 1,700. Altogether it has been calculated that over 2,500,000 acres were affected by the acts prior to 1801.

The result meant better farming, but it also involved great loss to the peasant and the laborer. The fees of the commissioners for redistributing the lands, the legal expenses of getting a private act, the cost of hedging the new farm, all bore hardly on the yeoman. Even when he had survived the actual enclosure he found it hopeless to compete with the capitalist farmer. The stuff he could raise would not bring a remunerative price in competition with that of the large producers. He was moreover hard hit by the loss of the bye employments of spinning and weaving which were tending to become more and more factory industries. Many of the yeomen sold their little farms to large landowners who were only too anxious to throw them together into big ones in order to realize the high prices during the war period. Moreover the new men who were making their money in cotton were glad to buy land for the sake of social position. With an increasing struggle for existence on the one hand and the prospect of a good sale on the other the small farmers sold their holdings and disappeared. Those that held on were so hard hit by the great depression in agriculture after 1815 that they too were forced to succumb. Hence England between 1770–1815 became predominantly the land of the capitalist farmer.

The laborers, too, suffered considerably, since when the land was enclosed they lost many little perquisites such as turning out a cow on the waste or gathering fuel. But more important than all was the fact that the laborer lost the chance of rising in the world. The small farmer had ceased practically to exist and the laborers never could hope to get together capital enough to take a big farm.

But without the improvements of those years England could not have held out against Napoleon. She would simply have surrendered from famine when the Baltic corn was cut off.

The stimulus of the Corn Bounty Act started the agricultural revolution; the great wars completed it. The result was an enormous advance in farming but great social distress; the extinction of the peasant proprietor, but the ultimate safety of England.

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29. AGRICULTURE SINCE THE 18TH CENTURY.

History.— The close of the 18th century saw the English system of farming fully established, with its characteristic division of the landed interest into the three classes of landlord capitalists, tenant farmers, and laborers. Agricultural improvement had indeed made great strides during the 18th century, and in some parts of the country, as in Norfolk and Herts, the change from the old open field system to large enclosed farms had already been accomplished, but it was the high prices for food, prevailing at a time when the rapid growth of a manufacturing population coincided with the Napoleonic wars, which finally swept away the village-community style of farming and replaced it by the large tenant holdings as known to-day. The old system, while it supported a good many poor men on the land, was a very inefficient method of feeding the nation. The first condition of agricultural improvement was the investment of capital in the land, and the most economical way of doing it has proved to be to allow the landlord to use his money on the permanent amelioration of his property, leaving the whole of the tenant's resources free to be employed in his business of farming. The advantage of this system lies in the fact that the tenant's capital is kept in a liquid condition; he becomes a manufacturer of meal and corn, who hires land and buildings as tools in his business. The development of improved breeds of live stock and superior strains of crops has been made possible by the existence of a race of tenant farmers with both the means and the temperament to speculate in the development of their industry. The system has of course its drawbacks; it demands that the landlord should possess capital and some understanding of the agricultural situation; it lacks flexibility when a great economic change takes place like the fall in prices after 1876; it encourages too conservative a style of farming, for it checks the initiative of tenants by giving small security that they will reap the benefit of any increase in the value of the farm due to their improvements. Its intense individuality, from which so much has been gained in the past, becomes a drawback now that the farmers of a country are no longer competing with one another, but have to be organized to maintain their position in the common market of the world.

The agricultural history of the 19th century in Great Britain may be divided into four epochs, beginning with the period of inflated war prices which lasted up to 1816, during which time the great work of enclosing the common lands and forming large farms was practically completed. This was also a period of great activity in the improvement of farming; the foundations of most of the British breeds of live stock were then laid; machinery began to be applied to agriculture, and the reclamation of the wastes, practically the creation of good arable soil out of barren sands and intractable clays, proceeded with vigor. The value of marl on the light sands, and of chalk and lime upon the clays had long been known, but at this time such ameliorations were being carried out wholesale and with a thoroughness of which the British farmer is still reaping the benefit. There followed a period of 20 years of unexampled depression when the great break in prices, consequent on the end of the war, was aggravated by a succession of bad seasons. Little by little this depression was removed as the obligations incurred during the time of inflation became void, as the weaker farmers and small holders became squeezed out, and particularly as the consuming population in the manufacturing towns grew in number and wealth. The 40 years from 1836 to 1876 may be described as the Golden Age of British farming. The making of the soil by marling, claying, chalking, etc., went on apace; something like 3,000,000 acres were tile-drained in England alone between 1830 and 1870; simultaneously also science and the industries put at the service of the farmer nearly all the modern range of fertilizers and feeding stuffs — guano, nitrate of soda, phosphates and the oil cakes. The modern breeds of live stock became clearly defined, and had their herd and flock books established during this period, and amongst the best practitioners farming became a fine art attaining the polish characteristic of a well-kept garden. Rents rose steadily with the competition for farms among not only the farming classes but also the tradespeople of the country towns, who saw in agriculture the road to wealth and an easy life; indeed, on the great estates where the tradition was against rack-renting the sound farmers were realizing very considerable fortunes.

The crowning period of this prosperity was the time of the Franco-German War of 1870–71. By 1875 the depression was beginning to make itself felt. Freights were low and foreign imports, especially American, of grain, wool, cheese and butter were beginning to grow rapidly. A run of bad harvests had also set in, culminating in the black year of 1879, when the lowest cereal yields on record, due to continuous wet weather, coincided with an enormous crop and corresponding importations from the United States. From this time the yield of corn in England ceased to rule its price, which has in the main been set in Chicago. The great change that then came over agriculture would have been less fatal had its permanent character been recognized earlier; as it was, on very many estates rents were not lowered rapidly enough, with the result that the old tenants were ruined and new ones could only be attracted by comparatively enormous reductions. Up till 1894 the gloom was unrelieved, the prices of corn and wool dropped year by year, although wages were rising, nor were there any new factors in sight which promised a change for the better.

It was the arable land farmers who suffered the most, particularly the cultivators of heavy land in the eastern counties and the midlands, where the land was expensive to work and only profitable when wheat and beans made a good price. This land gradually got laid down to grass; much of it went wholly out of cultivation for a time and was only reclaimed again as grass land by a new race of farmers who got it almost rent free. The western side of the country, which had always been in the main devoted to grazing and dairying and where rents had never been excessive, suffered comparatively little, nor did the highly farmed Lothians show the same fall in rents as the arable lands farther south.

Since 1894 the drop in prices has been arrested, and an upward turn has manifested itself for nearly all the products of the farmer, meat only excepted. At the same time, a new race of farmers had grown up, who discovered methods and openings by which a living may still be made out of the land. But though the agricultural situation may now be said to be comparatively stable and even improving, it is still full of difficulties. The British farmer is now competing with every country that has any agricultural produce to sell; the British market is the one open market of the world, and the price of any commodity is fixed by whichever country has a great surplus crop in that year. The proximity of the town, while it creates a market for certain products, also increases the farmer's expenses; in the end the manufacturing industries set the standard of wages and draw off the energetic and the able among the laborers. At the same time the farmer has to conform to the urban standard of life; he has to pay for roads, sanitation and education of a style unknown to his competitors in a primitive country. Again, as a capitalist, he expects a return for the money he has invested in his business, whereas his competitors are, in most cases, content if they extract a living out of their labor, without taking into account the capital they have accumulated on their small holdings. Even the proximity to the great population, which ought to be the saving factor, is nullified by high internal railway rates, which compare unfavorably with the assisted freights of most competing countries.

During the period we have under review the British tenant farmer may be credited with two characteristic steps forward; the perfecting of a system of high farming and the fixing and improvement of a number of races of live stock. As regards the first matter — high farming — three contributing factors may be noticed. Owing to the changeable climate and the diversity of the soils the preparation ot the land for crops has always required some nicety in management, and the British farmer in virtue of his long experience became something of an artist in the treatment of his soil. And though since prices have fallen some of his practices are no longer very remunerative, however desirable from the point of view of securing the «best» even if not the most paying crop, yet British farmers are still in the main more skilful than those in any other country, as far as the actual cultivation of the soil goes. Secondly, the British farmer early learnt the value of a good rotation of crops, which should not only provide something to sell, but which would also furnish a continual supply of food for his stock. The British farmer was the first to appreciate the possibilities which artificial manures put at his disposal; and the early exportations of guano, nitrate of soda, bones, etc., were in the main to the United Kingdom: Liebig even denounced England in no measured terms for her greed and wastefulness in drawing bones from all other civilized countries, and then squandering the phosphoric acid thus obtained by letting her sewage run into the sea. With the more intensive farming, due to better cultivation and the addition of manures, came improvements in the varieties of seed sown, mode of progress taken up with great energy both by individuals and certain firms of seedsmen. Though the results are not so noteworthy as in the case of live stock, yet most of the heavier yielding varieties, both of corn and of green crops, are of British origin, e.g., the «Squarehead» wheats, the «Chevalier» type of barley, the «drumhead» cabbage, all of which are widely spread over the world.

The final report on the Census of Production (1913) estimated the agricultural output of Great Britain at the value of £158,800,000, employing about 1,840,000 persons. The agricultural output of Ireland was valued at £45,574,000, and number of persons employed, about 984,000.

Live Stock.— But the special excellence of the British farmer has been his success in improving and fixing certain breeds of live stock, which have now become the standard breeds all the world over. Up to the middle of the 18th century there were a number of types of cattle and sheep to be found in the different districts of the British Isles, as in any other old farming country; but these types were ill-defined and there was no common or conscious action toward fixing them in any desirable direction. Robert Bakewell, of Dishley (1725–1795), working on Leicester sheep and Longhorn cattle, first showed how a breed could be improved and fixed. Bakewell aimed at an animal which would mature earlier and would put on its increase in the most profitable places. Carrying a type in his mind, he selected a number of animals approximating to his ideal and bred only from them; then by a period of close inbreeding among such of the progeny as conformed to the type, he was able both to advance rapidly in the desired direction and also to eliminate a good deal of the tendency to fall back toward the old unimproved class of animal. At the same time it was found that this close inbreeding resulted in sires which had great power of stamping their character on their offspring, even when the dam is of a different or common strain. Thus Bakewell's Leicester sheep have been employed to give quality to almost all the other local races, and there are nowadays few breeds of sheep in existence who do not possess a strain of Leicester blood in them. Bakewell's Longhorns have not had a like success, but the same principles were applied to the native cattle of Teesdale, the Durhams or «Shorthorns» by the brothers Colling, who died in 1820 and 1836, respectively. Their work, continued by the Booths and by Bates, resulted in the modern Shorthorns, the typical beef-producing cattle of the world, with which, in the main, all the newer countries have been stocked.

The same progress was applied to other local breeds of cattle; the Herefords and the Devons in England, and the Aberdeen Angus in Scotland, have in the same way attained to far more than a local reputation, as also have several of the breeds of sheep, like the Southdowns or the Lincolns. Notwithstanding the existence in all old-settled countries of indigenous races, stock of British breeds are to be found all over the continent of Europe, either kept pure or more generally used for grading up the local type; while in the newer countries, which have become the great food producers of the world, none but breeds of British origin are to be found, with the exception of the Frisian or Holstein cattle, the Merino sheep and the Percheron horse. Also, the United Kingdom remains the great fountain from which these countries find it necessary to replenish their breeding stock, so that the production of pedigree animals of high quality continues to be one of the most lucrative items in British farming. In 1916 there were in the United Kingdom 2,100,000 horses, 12,412,596 cattle, 28,770,692 sheep, and 3,604,620 pigs.

Agricultural Districts.— Farming has now become a highly specialized business, showing great adaptation to the diversities of soil, climate and markets in the British Islands. Beginning with the southeastern counties; Kent, Sussex, Surrey, and Hampshire form a fairly defined area, possessing in general a warm and dry climate. Here, but particularly in Kent, may be found the greatest development of market-gardening, fruit growing, hop cultivation, and other similar highly intensive forms of farming. As far as regards the production of very early crops this district cannot compete with the Channel Islands or Cornwall, but as main crops the standard green vegetables are grown in great breadths. This district is also noted for its hardy fruit growing; near Southampton on one hand and later in North Kent the greater part of the strawberries for London are produced. The best cherries have long been a special feature of East Kent, which country is also the largest producer of plums, apples, currants, and nuts.. East Kent shows without doubt the best kept orchards in the country. Hop cultivation is also another leading feature of this district; no other farming industry is carried on so intensively or spends more on labor during the growth of the crop. The best of the hops march with the fruit in East and Mid Kent, but Sussex is also a large grower, as also is a belt of rich land stretching from Farnham in Surrey as far as Petersfield in Hampshire. The district under review has not perhaps the same reputation for general farming as it has for fruit and hops; it possesses, however, several distinct and valuable races of stock. The Southdown sheep are natives of the open chalk downs of Sussex; small, fine-wooled, and models of symmetry, they have been extensively used for improving the mutton of other breeds and form a great element in the foundation of such breeds as the Hampshire and Oxford Downs, the Shropshires and the Suffolks. Kent possesses in the «Romney Marsh» sheep one of the older breeds of the country; big, hardy, and long-wooled, which have lately proved valuable for cross-breeding in all parts of the world. The Hampshire Downs constitute a large framed, rapidly-growing breed that has been formed from a local coarse sheep by crossing with the Southdown. It exists in large numbers on the light arable lands of the great chalk area of which Hampshire forms the centre. Sussex also possesses a local breed of cattle; a horned, all-red, typically beef-producing breed, which has not spread greatly beyond its proper borders. Hampshire passes insensibly into the West Country — Wiltshire, Dorset, Somerset, Devon, and Cornwall — a typical stock district, showing less and less arable land toward the west. This is one of the chief dairying countries, milk being sent to London; while Somerset, in particular, is the original home of the «Cheddar» cheese, the typical cheese turned out nowadays on such a large scale in the United States and Canada. The cattle are mainly Shorthorns, though Devon possesses a dairy breed of its own, the South Hams, which have been raised from the true Devons by an infusion of Guernsey blood. The true Devons are an all-red, beef-producing breed, doubtless of common origin with the Sussex, but which has gone all over the world as among the thriftiest and most profitable of grazers. The Dorset horned sheep are characteristic of this area, a short-wooled, horned breed valuable for the production of early lambs. Somerset and Devon are also great apple-growing counties, though the fruit does not receive the care which is to be found in Kent, and much of the product is only useful for cider-making. The southwest of Cornwall possesses an extremely mild climate, frosts being few and of no great severity; it has therefore become an important market-gardening district for the production of the earlier green vegetables and potatoes. The Channel Islands share the same advantages of climate, and, thanks to the skill and industry of their inhabitants, form perhaps the most prosperous agricultural community in the Kingdom. The land is divided into small holdings and is highly rented, but the farming is intensive and the crops valuable. In Jersey early potatoes, followed by green vegetables, form the staple crops; in Guernsey there has been a great development of farming under glass; cucumbers, tomatoes, grapes, early beans and flowers being the chief products. Each island possesses a special, though closely-related, breed of cattle, which by law has been kept pure and unmixed from any foreign blood for more than a century. These Channel Island breeds represent the descendants of an original Celtic race of cattle and are distinguished by the tendency to a yellow skin and black hair; they are small in frame, and produce large quantities of milk far richer in butter than that of any other breed. The Jerseys, in particular, have been largely exported to America as milk and butter producers.

The West Country shades off into the west Midlands — Gloucester, Hereford and Worcester, counties growing much hardy fruit and typical producers of cider. Here also is situated the other hop-growing area in the British Islands, the acreage under hops in the valley of the Teme and its tributaries tending to increase, while it diminishes in the southeast. This district is the original home of the Hereford cattle, red with white faces, which have become one of the great cosmopolitan races, famous all the world over as hardy stock fattening readily upon grass.

The Midlands proper are almost wholly laid down to grass; the broad belt of strong pastures stretching from Devon to Yorkshire, forms the great milk and meat-producing area of England. The cattle are mainly Shorthorns, as being valuable for both meat and milk, but many Herefords, Galloways and Welsh black cattle are also found fattening on the richer pastures. While these Midland pastures largely send new milk into the great towns, a good deal of cheese is made, the best known variety being the “Stilton,” which is as typical of the English soft-curd cheeses as “Cheddar” is of the hard curd. Eastward the land comes more under the plow, Essex, Suffolk, Norfolk and Lincoln being typical arable counties. Lincoln possesses a large area of “warp” land composed entirely of alluvial sediments, and this, of great fertility for all purposes, is very largely given up to the growth of potatoes. On the strong soils of Essex and Suffolk the best English wheat is grown, wheat being still a profitable crop in this district; while Suffolk and Norfolk enjoy a great reputation for the growth of high-class malting barley. These counties are still, though not to the same extent as formerly, great centres of stall-feeding of cattle. Welsh “Runts,” Shorthorns, and Aberdeen Angus stores are brought in and rapidly fattened on the turnips drawn from the arable land. Norfolk possesses a native breed in the Red-Polled cattle, valuable for both their flesh and their milk-producing powers, and which are rapidly establishing a reputation outside of England. In Suffolk also is to be found a special breed of heavy horse, the Suffolk Punch, a compact, thickset animal of great value for farm work. All the low-lying country forms a fine breeding ground for horses, which is one of the staple industries of the eastern counties. The fen country indeed is the original home of the typical English “great” horse, the Shire horse, the most powerful animal of its kind in the world, particularly adapted to heavy work in cities. Bay, brown, and black are the commonest colors, and the feet and legs are thickly grown with white hair; the breed probably owes its origin to an influx of Flemish blood into the old English draught horse. Lincoln also possesses the chief of the English long-wooled races of sheep; heavy, rapid-growing animals, with a great fleece of long slightly lustrous wool. The Lincolns have been exported in large numbers to Australia, New Zealand and the Argentine for crossing with the Merino to yield a sheep equally valuable for both mutton and wool.

Turning to the west again, Wales is a country almost wholly in permanent grass; dairying and the raising of store cattle to be fattened in the midlands and east of England being the prevailing industries. The Welsh black cattle are good milkers, and, in addition, have long been esteemed, under the name of “Welsh Runts,” as hardy, thrifty grazing cattle, producing beef of high quality. Like all mountainous countries, Wales has a race of hill sheep, but on the lower lands, and especially in the border counties, the “Shropshire” breed will most commonly be seen. The Shropshire sheep is a short-wooled, small-framed animal, rather large and hardier than a Southdown, but otherwise fulfilling the same purposes, producing mutton of the highest quality upon grass land and the lower hill pastures. On the Welsh borders also is to be found one of the native breeds of hill ponies, very slightly different from the two other breeds living upon Exmoor and in the New Forest, but quite distinct from the Shetland ponies, which are doubtless of Scandinavian origin.

Yorkshire provides perhaps the most varied farming in England; on the one hand there is the rich warpland adjoining the Humber, and the elevated arable sheep-farming land of the Wolds, then the highly-farmed general-purpose land of the central plain which merges into the upland sheep walks of the limestone country in the northeast. Horse breeding, stock raising and dairying are the mainstays of Yorkshire farming, and though no breeds of great note are associated with Yorkshire, except the white Yorkshire pigs and the Cleveland Bay Coach horse, it should not be forgotten that the original home of the Shorthorn was just as much the North Riding of Yorkshire as the Durham Tees-side, with which their names is always associated.

In the northern counties generally may be seen some of the best arable farming in England; a four-course rotation is generally followed, the foundation of the whole system being a good crop of Swede turnips, part of which are fed on the land to sheep, part carted off for fattening stock in the yards. Barley is the money-making crop in the rotation, oats being the other cereal usually grown. The typical cattle of all this district are Shorthorns; in Cumberland, which is more of a grazing country, they are of the milking type, the beef strains predominating in the eastern side. The sheep are the Cheviot breed for the hill pastures, and the Border Leicester, which was originally produced by crossing the Cheviots with Bakewell's Leicester breed.

Scotland and Ireland.— Crossing the border in the Lothians of Scotland will be found the most highly-farmed general-purpose arable land in the British Isles. Here the management of the land, the utilization of labor-saving machinery, and the application of skill to intensive cultivation, reach a higher pitch than anywhere else in the world. The cropping is much the same as that of the other northern counties, but potatoes form the most remunerative crop; in the famous Dunbar district they are often sold standing in the field for $150 (£30) per acre.

The southwest of Scotland is pre-eminently a grazing district; it is the home of two of the most distinct breeds of cattle, the Ayrshire, a typical dairy cow, yielding milk particularly suited for cheesemaking, and the Galloway, a polled black animal, characterized by its great hardiness and the fine quality of its beef. For generations the Galloways, either pure, or in the well-known «blue-gray» cross, have been exported to be fattened in the Midlands and east of England. The more northern counties of Scotland, naturally, in the main consist of grazing land. They have their typical race of Highland cattle and also carry the Scotch black-faced sheep, both slow-maturing hardy breeds, producing meat of high quality. The eastern counties, particularly Aberdeen, show some highly-farmed arable land, noted for the magnitude and high quality of its turnip crops, on which the cattle are stall-fed through the winter. For this purpose another race of cattle, now of cosmopolitan distribution, has been evolved, the polled black Aberdeen-Angus, massive animals noted for their rapid growth, symmetry, and quality of flesh.

Irish agriculture is of two classes; on the one hand there exists, especially in the west, a great number of small holdings, worked entirely by the single family, producing potatoes for home consumption and a little oats for sale, in addition to the milk or butter from a few cows on the rough grazing attached to the holding. The farming of these peasant proprietors is naturally of a primitive character, but the efforts of the Irish Co-operative Organization Society and later of the Irish Board of Agriculture have, during the last 20 years, done much to ameliorate the conditions under which they are working, particularly by the introduction of co-operative creameries. The Irish peasant farmer has quickly learnt to work on co-operative principles, so that the movement toward co-operation, headed by Sir Horace Plunkett, has enormously improved the character of Irish butter, a staple article in the English market, and must have nearly doubled the returns to the producer. On the other hand, Ireland possesses large farms of the richest grazing land on which are bred great numbers of store cattle of the Shorthorn breed for the English market, as well as light horses of the best strain, wholly or nearly thoroughbred. The high quality of the pastures give these animals a foundation of bone and vigor of constitution which makes them respond freely to richer conditions in later life.

Science and Education.— Any survey of British farming for the last century would be incomplete if it did not take some account of the scientific and intellectual resources which have been at the service of the British farmer. Of these the Rothamsted Experiments form the main, practically the only British contribution to the world's stock of agricultural science. The foundation of these field experiments dates back to 1843, in which year J. B. Lawes, a Hertfordshire landowner, obtained the co-operation of J. H. Gilbert to carry out experiments upon field crops upon his own estate. This partnership in investigation lasted for nearly 60 years, the continuity of the work being secured by a Trust founded and endowed by Lawes. The main feature of the Rothamsted investigations has been field experiments with the various farm crops, conducted on a large scale and over a great period of time, and to them the farming community owes its knowledge of the principles of the nutrition of our domesticated plants. In 1906 the «James Mason» laboratory for agricultural bacteriology was added. Rothamsted was the forerunner of the many agricultural experimental stations which have been created in other countries; the first German Station at Möckern dates from 1852, the first American Station at Middletown, Conn., having been founded in 1875. It is noteworthy that though agricultural research has in every country become the business of the State, Rothamsted remains the only institution of its kind in the British Islands and receives an annual grant from the Development Fund of £2,850 ($14,250).

From about the same period as the foundation of the Rothamsted Experiments, dates the establishment of the Royal Agricultural Society, which, by its institution of national agricultural shows held year by year in different parts of the country, has done much to foster the improvement of English live stock. For a long time also this society by its 'Journal,' by its appointment of consulting scientific advisers, by undertaking analyses for its members, was a great educational factor in the country, but the work of the society in this direction has of late years been largely taken over by other and more widespread agencies, while the society has no longer found fresh pioneer work to do but has more and more confined its energies to its annual show.

Agricultural education in Great Britain was for a long time restricted to private enterprise, the Royal Agricultural College at Cireneester being the first, and for a long time, the only institution giving a systematic training in agricultural science. There were in 1916 21 agricultural colleges in the United Kingdom, as well as professional chairs of agriculture in London, Reading, Bangor, Edinburgh, Cambridge and Leeds universities. According to official statistics for 1914, the acreage of arable land in the United Kingdom was:— England, 10,306,000 acres; Wales, 692,000; Scotland, 3,295,000; Ireland, 5,027,000; Isle of Man and Channel Islands, 93,000. The live-stock figures for the same year showed 1,850,042 horses; 12,184,505 head of cattle; 28,000,000 sheep; and nearly 4,000,000 pigs. Total permanent pasturage, 27,351,000 acres; other grazing land, 13,000,000 acres.

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30. BRITISH FISHERIES. Sea Fisheries.— The great extent of seaboard in proportion to the land area of the United Kingdom combines with the wealth of the surrounding seas to render the fisheries a very important branch of British and Irish industry, as may be seen from Table I compiled from the returns for 1913 — the last normal year before the outbreak of the European War, which, of course, has seriously interfered with the industry, withdrawing very large numbers of men from peaceful occupation and exposing those who continue fishing to risk of capture or destruction of boat and gear.

TABLE I — ESTIMATED NUMBER OF MEN AND BOYS REGULARLY OR OCCASIONALLY EMPLOYED IN DIFFERENT MODES OF SEA FISHING IN 1913.

	Regularly employed			Occasionally employed			Total employed
	In trawling (except for shrimps)	In other modes of fishing	Total	In trawling (except for shrimps)	In other modes of fishing	Total	
England and Wales	19,470	17,972	37,442	1,438	5,924	7,362	44,804
Scotland	3,090	26,732	29,822	....	4,682	4,682	34,504
Ireland	1,528	6,324	7,852	139	11,023	11,162	19,014
Isle of Man	105	323	428	....	150	150	578
Channel Islands	109	395	504	7	119	126	630
Total	24,302	51,746	76,048	1,584	21,898	23,482	99,530

TABLE II — QUANTITY AND VALUE OF FISH, AND VALUE OF SHELL FISH DECLARED AS LANDED IN 1913.

	Fish (excluding shellfish) cwts.	Fish (excluding shellfish) £	Shellfish £	Total value £
England and Wales	16,152,000	10,009,000	328,000	10,337,000
Scotland	7,828,350	3,997,717	72,354	4,070,071
Ireland	676,392	294,625	63,922	359,547
	24,656,742	14,301,442	464,276	14,696,618

It may be seen from this table, which does not include salmon fisheries, how greatly the trawling industry preponderates in England and Wales as compared with other parts of the Kingdom. In Scotland only 10 per cent of the regular fishermen were engaged in trawling; in Ireland, 20 per cent, while in England and Wales trawling employed 8 per cent more hands than all other modes of fishing combined. This table does not include persons engaged in subsidiary occupations dependent upon the fisheries, such as boat-builders, coopers, boxmakers, packers, curers, gutters, net-makers, etc. These were estimated in Scotland alone in 1913 to number 52,448. If the ratio may be assumed to be similar in England, Wales and Ireland, the total number of persons, who, before the war, depended for a living on the sea-fishing industry cannot be far short of a quarter of a million. The total weight and value of fish (not including salmon) and the value of shell-fish landed in the United Kingdom during 1913 are shown in Table II.

The craft of all kinds employed in the fishery were registered thus:

TABLE III — NUMBER AND GROSS TONNAGE OF FISHING VESSELS AND BOATS REGISTERED IN ENGLISH AND SCOTTISH PORTS, AND THE NUMBER SO REGISTERED IN IRISH PORTS IN 1913.

	Number	Tonnage
England and Wales	11,376	327,917
Scotland	8,991	136,905
Ireland	5,093	not recorded

Great changes have been wrought in the character of the British fishing fleet during the past 25 years owing, first, to the increased application of steam power to first and second class boats; and second, to the introduction of internal combustion engines to fishing craft of all sizes.

In Ireland there were 147 motor fishing boats owned in 1913, viz., 33 exceeding 25 tons burthen, 46 over 10 and not exceeding 25 tons, 30 over 5 and not exceeding 10 tons, and 38 not exceeding five tons.

The equipment of trawlers with wireless telegraphy dates from 1912, when a series of experiments were undertaken by Messrs. Hellyers of Hull and the Marconi Company. They were very successful, and previous to the outbreak of war a considerable number of vessels had been fitted with the apparatus. One direct result of the substitution of steam for sailing has been to extend the range of British fishing vessels far beyond what was formerly possible. The North Sea continues to be a most productive fishing ground. It was there that trawling with steam power originated from British ports, and it was some years before British fishermen lost their monopoly of that branch of the industry; but steam trawlers eventually began to issue from all the continental ports in the North Sea, and now they come from Spain, Portugal, Iceland, Russia and Italy. Outside the North Sea, powerful steam trawlers and liners from the eastern ports of England and Scotland carry on operations in far distant waters off Iceland and the Faroe, off the coast of Portugal and Morocco, etc., and earn handsome profits both in the home market and in foreign ports. The fish so caught and landed abroad do not figure in the returns quoted in Table II. "For instance, one English trawler fishing off the French coast near Brest, in 70 fathoms, took 300 kits of fish which, in the Lisbon market, some 600 miles distant, realized £444. On the next day the same vessel commenced fishing off Cape Finisterre, in 120 fathoms, and in four days returned to Lisbon and sold some 200 kits for £378."*

TABLE IV — RETURN SHOWING THE RELATIVE PROPORTION OF SAILING, STEAM AND MOTOR FISHING BOATS.

	1893			1913		
ENGLAND AND WALES	Sailing	Steam	Motor	Sailing	Steam	Motor
First-class boats	3,270	564	0	1,280	2,183	153
Second-class boats	4,099	2	0	3,603	205	194
	1895			1913		
SCOTLAND	Sailing	Steam	Motor	Sailing	Steam	Motor
All classes	12,940	158	0	6,762	1,661	523

Steam power, at first only employed in trawling vessels is becoming annually more common in drift net and long line fishing; motor propulsion, as aforesaid, being steadily on the increase, not only for small boats, but, on the East Coast, to boats of from 20 to 45 feet keel, intended primarily for line fishing, but also used for herring fishing near the coast. Drift nets are employed for taking herring, mackerel and pilchard. The relative value of these fisheries may be estimated from Table V.

TABLE V — TOTAL QUANTITY AND VALUE OF FISH RETURNED AS LANDED IN PORTS OF THE UNITED KINGDOM IN THE YEARS 1904 AND 1913.

1904	England and Wales cwts.	Scotland cwts.	Ireland cwts.	United Kingdom cwts.	Total value £
Herring	3,199,303	5,432,494	286,496	8,918,293	1,870,219
Mackerel	518,569	16,495	502,501	1,037,563	417,070
Pilchard	175,552	nil	nil	175,552	47,450
1913	cwts.	cwts.	cwts.	cwts.	£
Herring	7,313,425	4,449,323	420,620	12,183,368	4,573,295
Mackerel	345,095	74,348	7,211	426,654	182,864
Pilchard	51,563	nil	nil	51,563	21,865

The mackerel fishing on both the east and west coast of Scotland is capable of indefinite expansion if curing stations were established. Mackerel are regarded with disfavor in many parts of Scotland as an article of food; fishermen dislike them because they believe, not without reason, that they drive away the herring, and large quantities of mackerel taken in nets are thrown overboard. Thus in September 1904 one boat landed 60 crans of fine mackerel at Kyle of Lochalsh. (A cran of mackerel contains an average of 400 fish). Forty crans were sold fresh at eight shillings a cran, and 20 crans were thrown away as there was no means of curing them.

While the local herring fishery is actively pursued from almost every creek approached by the fish, powerful boats from Yarmouth, Lowestoft, Grinsby, and 10 other principal English ports, and from Eyemouth, Leith, Fraserburgh, Buckie and 14 other Scottish ports seek the fish irrespectively of distance or locality. East coast fishermen generally are far more enterprising and industrious than those on the west coast of Great Britain and Ireland. The reason for this appears to be connected with ethnology, men of Anglo-Saxon and Scandinavian blood taking far more readily to the sea than those of the Celtic race. A large proportion of the fish landed on the west coast of Britain and in Irish waters are taken by east coast fishermen; and in those places on the west coast where the local industry is most active, such as Stornoway in Lewis, Peel in the Isle of Man and Morecambe Bay in Lancashire, there is a strong Scandinavian strain in the population, derived from the long period when these districts remained under Norse dominion. The British export trade in fish, both fresh and cured, is very large, as shown in Table VI.

The European War has completely dislocated this trade. Germany and Russia had previously been the chief customers for cured herrings, taking between them about four-fifths of the whole export, notwithstanding the German import duty of three shillings a barrel and the Russian of 13 shillings a barrel. The United States takes the larger part of pickeled mackerel from the Irish fisheries, and pilchards find their principal market in Italy.

It is not a little remarkable that, notwithstanding the large exports of fish from the United Kingdom, there are also very large imports, to the value in 1913 of £5,030,499, whereof £3,312,958 was for fish, including shell-fish and turtles, imported from foreign countries, and £1,717,541 for imports from British possessions overseas. The value of canned salmon imported from the United States was £698,018, and from Canada £900,068.

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*Board of Agriculture and Fisheries, 1904, p. 22.

Considerable friction has arisen in the past between trawlers and line-fishers, owing to the destruction of lines laid upon ground whereon trawlers work. Parliament considered it undesirable that the more ancient industry of line-fishing, often pursued by men of humble means, should be sacrificed to the interest of persons of capital, residing, it might be, far from the fishing grounds. It was also deemed expedient to protect young and undersized fish from destruction by trawls. Statutory powers accordingly have been conferred upon the fishery boards of the three kingdoms to schedule certain areas, specially suitable for spawning ground, within which trawling is prohibited. But whereas certain of these scheduled areas, such as the Moray Firth, include water outside the three-mile territorial limit, the jurisdiction of British courts cannot apply to foreign trawlers working within the prescribed area, but outside the three-mile limit. Consequently, fish may be and are taken by foreign trawlers upon ground closed to British trawlers by the act of their own legislature; the fish so taken may be and, before the war, were landed in British ports to the intense indignation of the native fisherman. Meanwhile, scientific opinion is not unanimous upon the question whether the closure of these areas has any appreciable effect upon the general stock of fish in the adjacent seas; but it is undoubtedly favorable to line fishermen, to whom the prohibition does not apply.

TABLE VI — EXPORTS OF BRITISH FISH IN 1913.

	Fresh		Cured or salted	
	Quantity cwts.	Value £	Quantity cwts.	Value £
Herring	1,166,598	589,657	8,795,232	5,331,042
Salmon	6,753	63,137	37,101	38,676
Cod	41,272	47,227	373	2,023
Mackerel	14,849	16,010	441,983	601,945
Haddock	47,380	58,598	98,370	79,367
Shellfish	32,177	62,920	33,786	58,368
Other sorts	160,556	378,870	122,341	175,628
Total	1,469,585	1,216,419	9,529,186	6,287,049

The importance of the fishing industry as a nursery and reserve of practised seamen can hardly be overrated in a maritime nation, nor need it be apprehended that the progressive displacement of sails and oars by steam and internal combustion engines will impair its value in that respect. Any fears that may have been entertained on the subject must have been dissipated in view of the magnificent service rendered by thousands of British and Irish fishermen since the outbreak of the war in August 1914. Unfortunately, the nature and extent of that service may never be understood by the general public, nor the danger which these hardy fellows have willingly faced in exchanging their peaceful industry for the hazardous duty of mine-sweeping and patrolling the coast.

Upon the social system of regular fishing communities the advent of steam and motor engines has had a considerable effect. So long ago as 1883 Professor Mackintosh foresaw and noted the coming change. Writing about the fishing villages on the east coast of Scotland, he observed:

"Fishing is to be carried out no longer by more or less independent crews, bound together by blood relationship or other ties, whose working hours were largely regulated by the weather and tides, or their own convenience and necessities. Yet their whole domestic life was interwoven with the time-honored pursuit. Their wives and daughters laboriously baited the hooks and arranged the lines in the baskets for 'shooting'; they gathered the bent grass for separating the layers of the line, and, with the sons, dug lug-worms or procured the mussels for bait . . . Now, active and powerful vessels, propelled by steam and this more or less independent of weather, manned by a captain responsible to owners or their manager, a crew bound together only by discipline and pay, with a fishing apparatus requiring no bait, appeared on the field . . . Capitalists took up the question and fitted out powerful ships both in England and Scotland, and sent them into Scottish waters, so that liners met with most formidable rivals."*

It should not be understood from this that the "capitalists" referred to are wealthy landsmen speculating in an enterprise wherein they have personally no part. It is true that many trawlers and drifters are owned by companies, but these companies usually consist of men who have been fishermen, or at least seafaring men, from their boyhood and who have combined their resources so as to acquire suitable vessels and gear. Immense sums have been advanced by joint stock banks both to such companies and to individuals, and the industry is so profitable that loss on the transaction has very seldom been incurred. If steam has invaded the province of local fishermen on one hand, it has brought them advantage on the other by giving them access to distant markets.

The stern realities of a sea fisherman's life have imparted gravity to the demeanor of this class in all parts of the coast. Were it possible to obtain statistics, probably they would prove that the sea-fishers are among the most orderly and law-abiding in the community. The fish-wives of Musselburgh and Newhaven have preserved among them what is almost, if not quite, the sole survival of national costume in every-day wear. The short, heavy pleated, dark skirt, the woolen hose and serviceable shoes, the gaily striped "bed-gown" or blouse and the coat of thick pilot-cloth, are probably identical in form and material with those worn by the fish-wives who watched Queen Mary landing at Leith in August 1561. In those days, and for 300 years later, the fish-wives used to trudge up daily from the seaports in the Forth to Edinburgh, each with a heavy "creel" of fish on her back supported by a leathern band across the forehead. They come up by cheap trains now, but still their picturesque dress and archaic equipment afford a welcome relief to the uniformity of a modern metropolis and the by-streets still echo to their hereditary cries of "Caller Herrin!" "Caller haddies!" "Caller oo!" (oysters).

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*'The Resources of the Sea' by Professor Mackintosh (1899).

Inland Fisheries.— With the exception of salmon, fresh-water fishes have been turned to less commercial account in the Unifed Kingdom than, probably, in any other country of Europe. As a feed supply they are reckoned of no account, save that a considerable revenue, from £10,000 to £15,000 annually, is derived from the eel fisheries of Ireland.

All fresh water fish except salmon and trout are classed as "coarse fish," and are regarded of no market value; but in England and Wales an annual close time was provided for these by the Act of 1878, in the interest solely of anglers, who may be numbered by tens of thousands in the industrial districts, organized in fishing clubs and taking part in frequent angling competition.

For salmon there is a statutory annual close time in all three kingdoms, the minimum duration in England and Wales being 154 days for nets and 92 days for rods. In Scotland and Ireland the minimum for nets is 168 days, and in all three kingdoms a weekly close time for nets is fixed, varying from 36 to 48 hours. There is no weekly close time for rods, except that rodfishing for salmon is illegal in Scotland on Sundays. The annual close time for trout varies in different districts throughout the United Kingdom.

In the absence of any statutory obligation on the owners or lessees of salmon fisheries to render returns of their catches, it is impossible to obtain accurate information as to product of these fisheries. Through the courtesy of railway and steamship companies the weight of salmon carried to market is known approximately. Thus taking the *average* of eight consecutive seasons, it appears that there were delivered in Billingsgate Market, London, the number of boxes shown in Table VII, each box weighing about 100 weight.

TABLE VII — AVERAGE ANNUAL NUMBER OF BOXES OF SALMON DELIVERED IN BILLINGSGATE MARKET FROM BRITISH AND IRISH FISHERIES DURING EIGHT YEARS.

English and Welsh	1,435	boxes
Scottish	13,117	"
Irish	4,262	"
Total annual average	18,814	boxes

Facilities of travel in all parts of the United Kingdom have immensely enhanced the value of angling rights for salmon and trout. The rents now paid by sportsmen for salmon fishing and, within easy reach of London and other great cities, for trout-fishing, are such as would have appeared fabulous a couple of generations ago. Owners of inland and estuarine salmon fishings have begun to realize that anglers are willing to pay higher rents for their sport than net-fishers can offer for the exercise of their industry. The result has been the limitation, and in many upper waters the abolition, of net-fishing. Nor has this tended to stint the supply of salmon to the market, for the consequence of admitting more fish to the spawning grounds has been to increase the general stock of salmon to the advantage of coast and estuarine net fisheries.

Whale Fishing.— There remains to be noticed an industry of recent introduction into British waters which is classed as a fishery, although the object of capture is not a fish but a mammal. Previous to the invention by Captain Svend Foyn in 1865 of a bomb-harpoon to be fired from a small cannon, the mighty fin-whales — i.e., the blue whale (*Balæn optera Sibbaldi*) and the rorqual (*Balænoptera musculus*), both of which abound in the North Atlantic, were reckoned too formidable to be hunted. Now, however, steam whalers armed with Captain Foyn's guns enable the crews to attack the most powerful finners and in 1903 fishing stations were established in the Shetland Islands by Norwegian companies. In 1913–14 there were 13 steamers engaged in the fishing and the total number of whales taken in the 12 seasons, 1903–14, was 6,272, the value being estimated at about £627,200. Two whaling companies have been established in Ireland, each with two steamers. In 1913 they landed 114 whales, viz., 95 rorqual, 5 blue whales, 13 sperm whales and 1 humpback.

Bibliography.— Aflalo, P. G., 'Sea and Coast Fishing' (1901), dealing with sea-angling as a sport; Johnstone, James, 'British Fisheries, their Administration and Problems' (1905); McIntosh, W. C., F. R. S., 'The Resources of the Sea' (1899); 'Annual Reports' of the Board of Agriculture and Fisheries (England), of the Fishery Board of Scotland and of the Department of Agriculture and Technical Instruction for Ireland; International Fisheries Exhibition (1884), with much detailed description of the various modes of fishing and fishing gear; 'Report' of the Royal Commission on Trawling (1878).

HERBERT MAXWELL, F.R.S., LL.D., D.C.L.,
Lord Lieutenant of Wigtownshire.

31. THE MINING INDUSTRY. When it is considered that mining enterprise in Great Britain and Ireland accounts, at the present time, for the employment of no less than 1,236,210 persons directly engaged in the production of 354,890,867 tons of minerals estimated to be worth, at the mines and quarries from which they are drawn, the sum of £160,112,607, the vastness of the industry, and its effect on the economic life of the country will perhaps be more fully realized than by the recital of detailed descriptions of the various branches of mining. Indeed it may be said that the wealth of Britain is mainly due to the unique position, mineralogically, that it occupies relatively to other nations; for no country contains, proportionately to its area, so great or so varied a store of mineral wealth.

Mines in the United Kingdom are usually treated as coming within one of two categories, viz.,[1] metalliferous mines, and[2] those which are governed by the Coal Mines Act, the latter comprising chiefly coal and stratified ironstone mines, and being by far the most extensive and important section, though a development of later growth, having expanded through seven centuries to what, as judged by some, is believed to be the zenith of their development.

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[1] These figures are derived from the 'Mines and Quarries Statistics,' published annually in four parts by the Home Office as a Blue Book, comprising District Statistics, Part I; Labor, Part II; Output, Part III; Colonial and Foreign Statistics, Part IV. The figures are, except where otherwise

Of the metalliferous deposits[3] mined in the United Kingdom, the most important are, and have always been, the ores of tin, copper, lead and iron. Native silver has never been worked, and it is doubtful whether it occurs in Britain or Ireland, although Strabo writing about 19 A.D. mentions silver as well as gold as being among its products.[4] Tacitus also makes reference to it indirectly.[5] Gold is very sparsely disseminated, occurring in mineral veins, found chiefly in Merionethshire[6] (North Wales), Lanarkshire (Leadhills, Scotland) and Cornwall; and in some alluvial deposits in Sutherlandshire (Scotland) and Wicklow (Ireland).

Probably the earliest mining on commercial lines in Britain was that of tin. The "Cassiterides,"[7] whence the Phœnicians obtained their British tin, were, in all probability, what are now known as Scilly, the Channel Islands, and, more particularly, Cornwall. The industry is and always has been restricted to Cornwall and, to a very small extent, to the contiguous part of Devon, and as early as 60 B.C. we find Diodorus Siculus describing the tin trade of these parts. In the early years of the 19th century (1817) Cornwall was the chief source of production of the world's supply of tin, now it stands fifth on the list of tin producing countries, contributing only 4.25 per cent of the total production.

What has been written of tin is also largely true of copper. Carew[8] said, writing about 1600, that he could not find that it was being profitably worked in the west of England, yet nearly two centuries later, the production[9] (during the dicennial period 1766–75) was abnormally large, and as late as 1888 we find no less

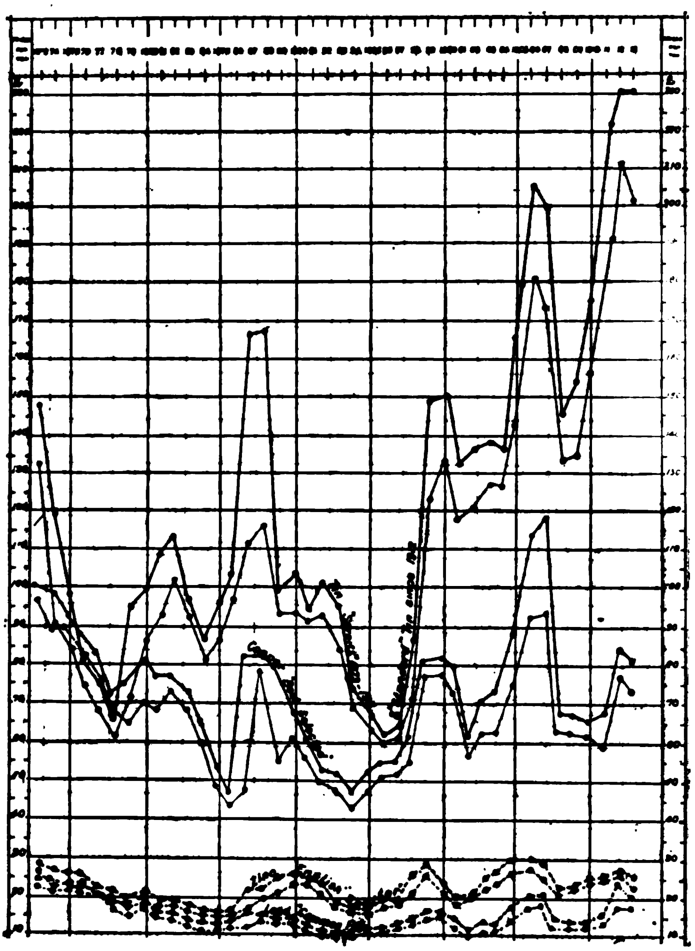

FIG. 1.— SHOWING THE FLUCTUATIONS IN THE PRICES OF COPPER, LEAD, TIN AND ZINC IN THE LONDON MARKET FOR EACH YEAR SINCE 1873. (The thick lines show the highest prices and the thin lines the average prices.)

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stated, those for the year 1913 — the year before the war. The figures if taken during war years would not constitute reliable comparisons.

[2] Final 'Report' of the Royal Commission on Coal Supplies. This commission was appointed in 1903 and published its final report in 1905.

[3] The limited extent of metal mining (exclusive of iron ore) is evidenced by the fact that only 26,406 persons were employed during the year 1913 in producing metaliform minerals other than iron and minerals commonly designated as "non-metallic" such as barytes, gypsum, limestone, oil shale, rocksalt, sandstone, slate, etc.

[4] Book IV, Cap. 279. Clearly some process of extraction of silver from rich silver-lead ore (galena) must have been in vogue.

[5] In the life of his father-in-law — 'Vita Agricolæ.' Agricola in an oration to his soldiers before the battle, near the Grampians (84 A.D.) exclaims: "*Fert Britannia aurum et argentum et alia metalla, pretium victoriæ.*"

[6] 'The Occurrence of Gold in Great Britain and Ireland,' by J. Malcolm Maclaren, B.Sc., F.G.S., in the 'Transactions' of the Institution of Mining Engineers, Vol. xxv, pp. 435–508.

Hence, "cassitarite," or oxide of tin, the commonest ore of that metal.

[7] 'Tin Deposits of the World,' by Sydney Fawns, F.G.S. For a clear statement of the present position of Cornish tin mining, the articles which appeared in the Engineering Supplement of the 'Times' (Sept. 27, Oct. 18, 1905) should be consulted. Tin *mining*, in the strict sense of the term, probably dates from the 11th century, before that time the whole of the tin being derived from "Stream Works." In 1884 the British output of tin ore amounted to 15,117 tons of tin ore (black tin), worth about £40 a ton; the product has year by year decreased, until during 1913 the output was only 8,355 tons, worth about £115 a ton. The price of metallic tin was in 1912, £212,11,0, a ton, the highest recorded price of English block tin. The average price during 1913 was £204, 6.8

[8] Carew, Richard, of Antoine, 'Survey of Cornwall.'

[9] William Pryce in his 'Mineralogia Cornubiensis' gives the output as 264,273 tons of copper ore during this period, averaging in price £6,14.6 per ton.

an authority than the late Mr. D. C. Davies[10] stating that *for their size* the British Islands constitute the greatest copper producing country of the world, but the production has greatly dwindled since the time he wrote. Cornwall and Anglesea are the chief copper bearing districts in the kingdom, and very remarkable profits have, in times past, been derived from some of the mines.[11]

The production of lead far exceeds that of tin and copper,[12] and as in the case of tin and copper, signs of a revival are not wanting, still, it is very doubtful whether this branch of mining in the United Kingdom will in the near future attain to a similar state of prosperity as that experienced about the year 1877. Lead mining in these islands is of considerable antiquity; we know that lead ore was mined in Shropshire in the days of the Emperor Hadrian from the fact that «pigs» of lead were some years ago discovered in the refuse heaps of the Roman Gravel Mine in that county, one of which is preserved in the Geological Museum in Jermyn street. It may be mentioned of this district that, though possibly the smallest mineralized area in Europe, it was believed by so great an authority as the late Sir Roderick Murchison[13] to be probably unequaled for its size, in point of wealth in lead ore.

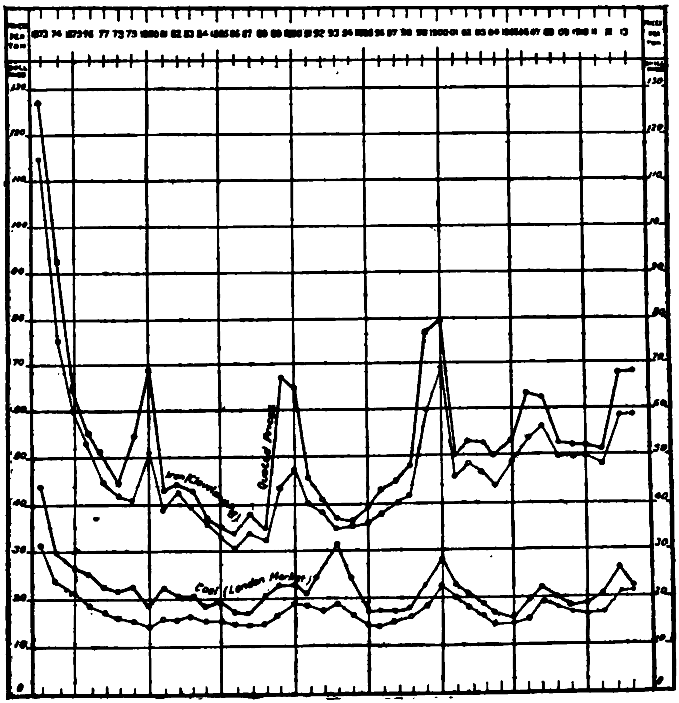

FIG. 2—SHOWING THE FLUCTUATIONS IN THE PRICES OF COAL AND IRON FOR EACH YEAR SINCE 1873. (The thick lines show the highest prices and the thin lines the average prices.)

In Shropshire, North Wales, Cornwall, Isle of Man, and the Pennine Chain are situate the chief lead mining areas of the kingdom. Lead mining in general had not of late years—until the last year or two—been very profitably conducted in the United Kingdom. Though far from being exhausted, except in few instances, the mineral veins are not of such a character as to allow of their being as cheaply exploited as the richer deposits of Spain, Australia and some other extensive lead-producing countries. As these more bountiful districts become exhausted, one is justified in assuming that British lead mining will be more extensively developed.

Fig. 1 shows diagrammatically the fluctuations in the prices of copper, lead and zinc in the London market for each year since 1873 to 1913 inclusive.

The iron ore deposits of Great Britain[14] are of two kinds, viz., stratified iron ore—the mines of which come under the control of the Coal Mines Regulation Act—and the «mass» and «veined» deposits of hæmatite which come within the jurisdiction of the Metalliferous Mines Act. Cumberland and North Lancashire which yield an output of nearly one and a half million tons, are the source of the famous red hæmatite which chiefly occurs in the form of huge irregular masses in the carboniferous limestone and is the richest iron ore of the country, yielding on the average over 50 per cent of metal. Working one of these masses is probably the most extensive iron mine in the world—Hodbarrow mine.[15] The other principal iron producing districts are Cleveland (N. Yorkshire), which accounts for nearly six million tons annually; Lincolnshire, Northamptonshire and Leicestershire together supplying nearly six and a half million tons, the total production being nearly 16 million tons annually, valued at over four and a half millions sterling.[16] The Cleveland clay ironstone (carbonate of iron) is chiefly worked from a bed about 10 feet thick, in the Middle Lias, containing on the average about 30 per cent of iron. The ore from Lincolnshire, Northamptonshire and Leicestershire is derived from open workings in a bed of brown iron ore in the Inferior Oolite, and averages about 33 per cent of metal. The Scottish ore and that from North Staffordshire is largely worked from the Black Band ironstones (carbonate of iron) in conjunction with the coal in the collieries of those districts and varies considerably in richness of metal.[17] Fig. 2 is a graphic representation of the fluctuations in the price of coal and iron (London market) for each year since 1873 up to and including 1913.

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[10] 'A Treatise on Metalliferous Mines and Mining,' p. 125. Davies instances the fact, drawing his information from Hunt's 'Mineral Statistics of Great Britain and Ireland,' that in the year 1877 there were 101 copper mines at work in the kingdom, producing an aggregate of 79,252 tons of ore, valued at £317,186 7.7; of these mines 65 were in Cornwall. In 1863 the production of copper ore and copper precipitate amounted to upwards of 210,000 tons, valued at over a million pounds sterling. The output of copper ore (and copper precipitate) during the year 1913 was only 2,732 tons, valued at the mines at £27,029.

[11] Pennant's 'Tour in North Wales.' The Parys Mine, in the northern corner of Anglesea, worked for a long time and in a century and a quarter returned profits estimated at over £7,000,000. The copper at present derived from the mines in this district is obtained by precipitation of the copper in the waters pumped from the mines.

[12] The output of lead ore for 1877 was 80,850 tons, valued at £1,123,952, whereas during 1913 it amounted to but 24,282 tons, valued at £293,525. Vide 'Mines and Quarries Statistics.'

[13] Sir Roderick Murchison, F.R.S., director of the Geological Survey of Great Britain, 'The Silurian System' (1839, p. 282). He says, "we shall find there are few tracts of given extent in any part of the world which are veined to a greater extent."

[14] 'The Iron Ores of Great Britain and Ireland,' by J. D. Kendall, F.G.S., affords much reliable and valuable information on this subject.

[15] The output of ore from this mine during 1913 was 396,657 tons.

A description of British mining would be incomplete without some reference to the production of slates,[18] as in no country are there yielded slates of a quality equal to those of North Wales. The mines proper are mostly in Merionethshire, whereas the quarries are worked in Carnarvonshire, the Penryhn quarry, near Bangor, being the largest open working in the world, the underground workings of the Oakley Slate Quarry Company, Ltd., at Festiniog, Merionethshire, being the most extensive slate mine. The output of finished products from the individual mines and quarries constitutes only a part of what is drawn from the workings, it being calculated that there is a loss of about two-thirds in the "dressing" (cutting and shaping) of the slates.

No description is given in this review of the production of building and other stones, derived chiefly from quarries, as space does not permit of allusion to other than the more purely mining part of the subject.

The chief sources of the mineral wealth of the United Kingdom are the coal and iron deposits. Of the latter mention has already been made. The former far outweighs in importance all other branches of mining classed together.

Until the year 1899 the United Kingdom was the largest producer of coal in the world (see Fig. 3); it now stands second, the United States having outstripped it in the race for supremacy in this respect.

When coal first came to be worked in this country as a merchantable article, authorities are not agreed. It may have been worked in a desultory and uncertain fashion in very remote times, but the first substantial mention of coal mining is that contained in the records of Holyrood and Newbattle Abbeys,[19] in which it is shown that coal was dug on the south shore of the Firth of Forth in Scotland about 1200 A.D.; further, we know that coal was imported into London from Newcastle about 1257 A.D. Indeed, Novacastrians may justly claim the banks of the Tyne as the nursery of the coal trade, and to the present day the inhabitants have more than maintained their heritage of

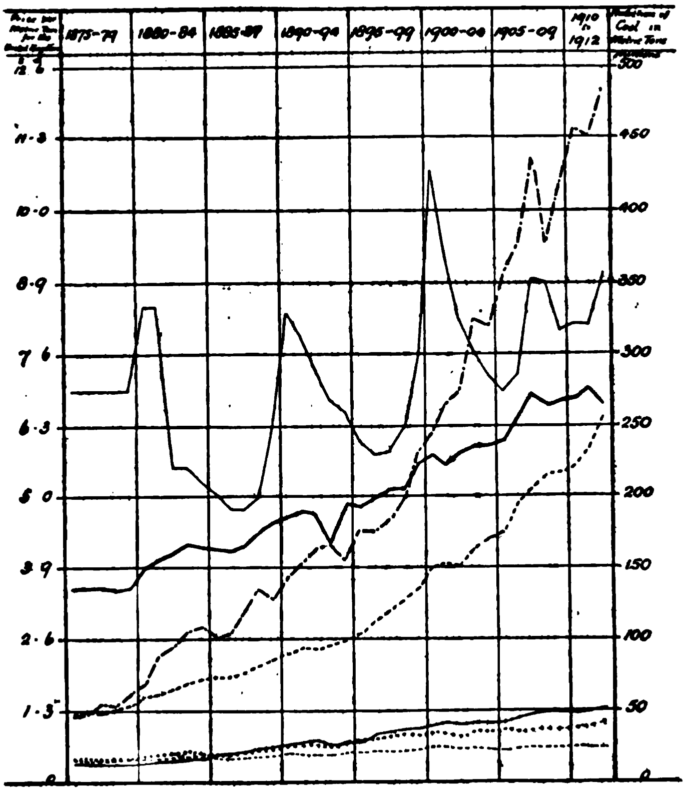

FIG. 3 — THE WORLD'S PRODUCTION OF COAL. IN METRIC TONS.

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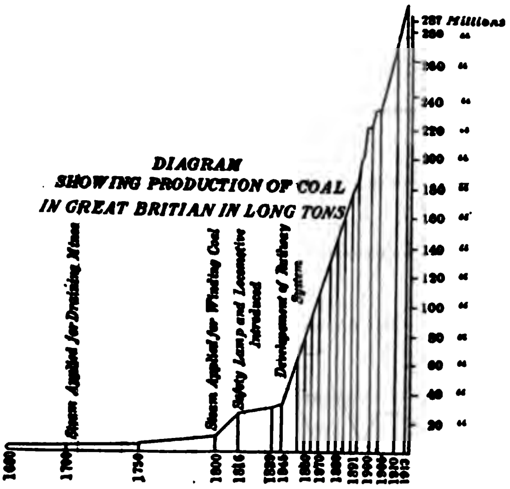
[16] The figures of 1913 give a total production from all classes of mines and quarries of 15,997,328 tons, valued at £4,543,358. 'Mines and Quarries Statistics.'

[17] The output of the various kinds of ore may be roughly proportioned as follows: Clay ironstone, 42 per cent of the output; black band, 9 per cent; hæmatite (red), 12 per cent; brown ore, 34 per cent.

[18] The total production of slates during 1913 was 370,756 tons, valued at £926,739. North Wales furnishes most of the slate, roughly speaking, in the proportion of two-thirds from open workings and one-third from mines.

[19] For an exhaustive and admirable history of coal mining in Great Britain, the reader cannot be referred to a more interesting and accurate record than the 'Annals of Coal Mining and the Coal Trade' (2 vols.) by R. L. Galloway.

skill and foresight, for there is no field in which the mining industry rejoices in better management, both in respect of the mining operations themselves and in the conduct of labor affairs, than the Great Northern coal field. The systems of «joint committees» of representatives of owners and men, and the respective associations of mine owners and of the workmen in Northumberland and Durham have constituted a pattern to be studied and an example to be followed by other mining districts, and have conduced in an eminent degree, to the equitable conduct of the trade and the harmonious relations existing between employers and workmen.



There is, perhaps, no trade, excepting the iron-making industry, more subject to variations of prosperity and depression than coal mining. It is often remarked that it is the first to prognosticate a cycle of general depression and the last to recover therefrom. Be that as it may, the words of the old chronicler[20] have a strangely modern ring about them, when read in the light of recent experience. «Many thousands of people,» he remarks, «are employed in this trade of coales: many live by working of them in the pits: many live by conveying them in wagons and waines to the river Tine: many men are employed in conveying coales in keeles from the stathes aboard the ships; one coal merchant employeth five hundred or a thousand in his works of coals: yet for all his labour, care and cost, can scarce live by his trade. . . . Nay, many of them hath consumed and spent great estates and dyed beggars.» The conclusion of the whole matter appeared to him to be that «their Collieries is wasted and their monies is consumed; this is the uncertainty of mines — a great charge, the profit uncertain.»

It is not proposed to follow the history of development of the coal trade in detail. The rate of this expansion and how it has been affected by various improvements in mining and facilities of transport are marked in the accompanying diagram, Fig. 4.[21]

One of the most remarkable characteristics of the carbonaceous deposits of this kingdom other than the number of the separate fields and their extensive area is the great variety in the fuel itself. The coal fields may be divided into groups as follows:[22]

I. English Coal Fields.

Midland Group.—(1) North Staffordshire; (2) South Staffordshire; (3) Leicestershire; (4) Warwickshire.

North Midland Group.—(1) Yorkshire; (2) Derbyshire and Nottinghamshire.

Great Northern Group.—(1) Durham and Northumberland; (2) Cumberland.

Northwestern Group.—(1) Lancashire and East Cheshire; (2) Coalbrookdale (or Shropshire); (3) Forest of Wyre.

Western Group.—(1) Bristol and Somersetshire; (2) Forest of Dean.

II. Welsh Coal Fields.

(1) South Wales; (2) Denbighshire and Flintshire.

III. Scottish Coal Fields.

(1) The Clyde basin; (2) Midlothian and Haddingtonshire; (3) Fifeshire; (4) Ayrshire; (5) Lesmahagow; (6) Canonbie.

IV. The Kent Coal Fields.

The development of which has only very recently been commenced.

V. Irish Coal Fields.

(1) Northern Group; (2) Southern Group. These are of small importance and little worked.

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[20] Grey, 'Chorographia, or a Survey of Newcastle-upon-Tine,' published 1649.

[21] After J. B. Simpson, M.I.C.E., *vide*, Address on the 'Rise and Progress of Coal Mining' (1896), the diagram has been further extended and brought up to date thus:

	Long tons, 2,240 lbs.
In the year 1660, it was estimated by the Royal Commission on coal (reported 1871) that the output of coal was	2,148,000
And that in 1770 it had risen but little, being but	2,612,000
Between 1770 and 1750, however, steam was applied to draining mines, and gun powder came to be used at underground operations, so that it was estimated that by 1750 the output had advanced considerably, being for that year	4,773,828
Later steam was applied to hoisting the coal up the shafts, and between 1760 and 1800 the development of the canal system took place, which gave a great impetus to the trade. So that for 1880 the output had increased to	10,080,300
In 1803 coal came to be used for the manufacture of gas, and in 1815 the safety-lamp was invented, which would further assist coal mining. Mr. Samuel Salt computed the output for 1816 to be	27,020,115
For 1845 Mr. J. R. McCullock puts the output at	34,600,000
The introduction of steam in navigation and the development of the railway system took place shortly before and about this time.	
The (1871) Royal Commission on Coal, sometimes called the Argyll Commission, the Duke of Argyll being its chairman, calculated that in 1855 the output had risen to the considerable figure of	64,307,000

The first year of which we have official returns is 1860. The following figures show the increase:

1860	84,042,698
1865	98,150,587
1870	112,875,575
1880	146,969,409
1890	181,614,288
1900	227,084,871
1905	236,111,150
1910	264,433,028
1913	287,430,473

The thickness of the seams worked in the fields varies from 11 or 12 inches to 30 feet, but the latter is restricted to South Staffordshire; this seam and the thick coal of Warwickshire being quite exceptionable. Cannel coal in Scotland has been worked, in some instances, when only six inches thick.

The variation in the character and quality of the coals within the different fields themselves is remarkable; for instance, first class coking coal is mined near the banks of the Tyne, yet only a few miles east of Newcastle the world-famed Wallsend household coal is produced, and by far the greater part of the Northumbrian output is exported as steam coal. Again, coke unrivaled in quality, is made from the coal mined in the western and southwestern part of Durham, whereas good gas and very superior house coal is raised from the collieries situate in the central and eastern part of the same county.[22] The principal steam coal-producing areas, other than Northumberland, are South Wales (pre-eminently), and parts of the Scottish fields — notably that of Fifeshire — to some extent Lancashire, North Staffordshire and Yorkshire; the other fields chiefly supplying manufacturing, iron smelting, gas and coking coals. Of all the districts, the variation in character of coal is most marked in the great South Wales field, in the south and southeast the seams of the lower shale series are bituminous in the middle and semi-bituminous, farther toward the northwest they are what is technically termed "dry" (i.e., contains very small percentage of volatile hydro-carbons) or steam coal, still further in the same direction they are semi-anthracite (i.e., still drier), and to the northwest and west again they are anthracites. The seams of the Pennant series, higher up in the coal measures, follow the same rule in transformation, but have a higher scale of bituminosity in comparison with the seams below them.[24]

A factor that must largely affect the future commercial prosperity of the country, indeed is vital to it — is the duration of its iron and coal supplies. The stores of iron ore, owing to the nature of the deposits, cannot be estimated with the same degree of accuracy as is possible in the case of coal, but it may be safely prophesied that their exhaustion will long precede that of coal. Working on the figures arrived at by the late Royal Commission on Coal Supplies, the time which would be taken to exhaust the coal fields at the present rate of output may be taken as about 600 years;[25] whether the present rate of output will be long maintained is, however, somewhat doubtful. For the last 40 years the average increase in the output has been, roughly, 2½ per cent per annum, and that of coal exported 10 per cent per annum, or put in another way the percentage of output shipped abroad from 1878 to 1912 inclusive has increased from 16.1 to 32.4 and in 1913 it reached the record figure of 34.2, but it is highly improbable, owing to physical reasons, that these rates of increase will be long continued. Some districts, indeed, have already attained their maximum, and decadence has set in, as for instance in the "exposed" part of the South Stafford coal field. The developments in the new coal fields will possibly increase the total output for some years, but the Royal Commission, just alluded to, "look forward to a time, not far distant, when the rate of increase of output will be slower, to be followed by a period of stationary output, and then a gradual decline." Nor do they hold out any hope that the resources may be husbanded by the utilization of any other source of power; they are convinced "that coal is the only reliable source of power and that there is no real substitute, though there are some sources which may slightly relieve the demand for coal."[26]

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32. THE INDUSTRIAL REVOLUTION.

Between the years 1770 and 1840 England became the workshop of the world. She changed radically in character; from an agricultural nation she became primarily a manufacturing one. She became dependent for her raw materials on foreign nations and on markets abroad for the sale of her goods. Her international position, therefore, was vastly affected and her prosperity became dependent on the state of trade. No less remarkable was the change in the relations of persons. A new middle class of manufacturers arose and the moneyed interest permanently overtopped the landed interest in social importance. Alongside of the employing class grew up the class of factory hands, and the business relations of the two classes had to be settled afresh and not without considerable friction. The industrial revolution involved, therefore, industrial reconstruction with all the disintegration and suffering that drastic reconstruction always causes.

Not more striking than the alteration in the character of English industry and in English social relations was the remarkable shifting which took place of centres of importance, for suddenly the North sprang into prominence and the South correspondingly declined. In this

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[22] The extent to which the different fields contribute to the total production may be roughly proportioned as follows:

		Million tons
Scottish coal fields		42½
English coal fields	Northumberland, Cumberland and Durham	58½
	Lancashire and North Wales	28
	Yorkshire and North Midlands	73
	Midland and Southern (Stafford, Leicester, Warwick, Gloucester, Somerset and Kent)	28
South Wales, including Monmouthshire		57
Ireland		⅒

[23] Professor Hull's 'Coal Fields of Great Britain' (sixth edition) should be consulted by the reader interested in further pursuing this subject.

[24] The annual output of anthracite is nearly 3,000,000 tons, practically derived entirely from this region.

[25] 'Reports' of Royal Commission on Coal Supplies. Final Report, 1905. The Commissioners computed that there were yet remaining to be worked in the "proved" coal fields, adopting 4,000 feet as the limit of practical depth in working and one foot as the minimum workable thickness, an *available* quantity of coal equal to 100,914,668,167 tons, and that the quantity supposed to exist outside the "proved" areas, *i.e.*, in the "concealed" fields, would amount to 39,483,000,000 tons. In calculating the period of duration there has not been taken into consideration the coal existent at a depth below the 4,000 feet limit, which in the "proved" coal fields alone is placed at 5,239,433,980 tons.

new industrial region huge masses of people were congregated on certain spots, and the problem of the large towns arose, with all the sanitary housing and other questions connected therewith.

Then came the problem of feeding these agglomerations of people and of getting rid of the goods they made, which questions were answered by the great revolution in the means of transport and the changes in the English fiscal system.

The industrial revolution is generally dated from the coming of machinery and is usually connected with the invention by Arkwright of a cotton-spinning machine in 1775 which was worked by water. It was the application of mechanical power to industry that constituted the novelty, for it was the invention of a substitute for man himself.

But events had been preparing for more than half a century for the introduction of manufacturing on a large scale in England. Inventors had always been numerous, but the conditions were present about 1770 which enabled an inventor to bring his ideas to a successful issue. In the first place there was in the England of that time an abundance of capital, owing to the development of the banking system, so that an enterprising man could get money to try experiments. Arkwright's machine is said to have cost $60,000 before it was perfected. Then, too, there was every prospect of large sales, without which machine production would have been unnecessary. England's markets were developing steadily in the 18th century, both at home and abroad. At home the revolution caused by smelting iron with coal had given rise to canals to transport the fuel and the result was a general quickening of intercommunications. New centres rose up and a greater demand for goods was created. The export of English goods was steadily rising in value and there was every chance of increasing the sales if goods were cheaper. Moreover in the 18th century the capitalist employer had become prominent. There was, therefore, a class of men trained to production on a large scale. The old mercantile companies with their rules as to limited sales had lost their power to dictate as to quantities and prices and there was no hindrance on that side to the enterprising man.

Yet although these forces were all making for a great change in the methods of industry the England of 1760 was an agricultural country. The leading branch of trade was cloth; cotton goods and muslins were imported from India and re-exported; fine cotton goods could not be made in England as the warp was too weak and linen had to be used. The iron trade had been threatened with extinction owing to the lack of timber and was only just beginning to revive when coal could be utilized for smelting owing to the invention of the Darbys about 1740; but much remained to be done, and it was not until Cort's invention of a means of puddling iron in 1784 that the iron trade made great advances.

In 1760 the Duke of Bridgwater was cutting the first canal and the turnpike roads were beginning to facilitate internal travel.

The majority of the work-people were either small manufacturers who bought the wool, wove it, and disposed of the cloth themselves, or worked on commission for some big-dealer. Nearly all of them had a by-employment in the shape of a small farm, while the women and children practically all over England were employed in spinning or carding. The incomes of the day were family earnings. As English cloth had almost a monopoly value the demand was steady; England grew the bulk of her own wool and was not mainly dependent on importation from abroad. The characteristic of the whole period was stability. If the orders for cloth fell off then the man had his bit of farm to fall back on — the one helped the other. Agriculture was not divorced from industry nor the workman from country employment, nor was there any marked distinction between town and country. It is probable that according to our notions the life was sordid and the standard of comfort low, and there is no reason to think that the parents were the easiest of taskmasters for the children. But the problem of the unemployed was absent, and the domestic workmen at all events decidedly preferred the life to that of the factory.

When machinery came it was curiously enough first of all applied to the languishing trade of cotton. The reason seems to have been that the supply of raw cotten was unlimited, while England was already on the verge of a wool famine. Sheep growing had not been started in Australia and there was no reason to anticipate that even if machinery came in the output would be largely increased. Moreover wool being more brittle than cotton it was found at first very difficult to adjust it to the strain of the machine without constant breakages. Hence wool is affected by machinery much later than cotton. Arkwright, a barber, revolutionized the cotton trade by his water frame, patented in 1775, which spun a yarn firm enough for the warp. Crompton followed this up by inventing the mule in 1775 which created the muslin trade; and Cartwright, a clergyman, brought out the power loom for weaving which was first used in 1801. Power spinning in the woolen trade did not become general till the first decade of the 19th century.

The effect of the cotton machines was to create a new trade. The great manufacturing centres had hitherto been Norwich and Devizes, but the new machinery needed water power, and hence the trade settled in the North in country districts where water was available. The first machines were small and simple; were made of wood and necessitated a good deal of bending over by grown-up persons. They could easily be worked by children, but such labor was difficult to obtain in the country in large quantities, hence the massing of pauper children in these factories. There seem to have been grave abuses in the system and a new era was inaugurated by the Health and Morals of Apprentices Act of 1802 which limited the working hours of apprentices to 12 per day.

The problem, however, was altered when steam came in owing to Watt's invention. It was only substituted gradually for water power, coming in more and more after 1815 and becoming the prevalent type altogether in 1840. The important thing now was no longer water but coal, and to get coal the factories had to settle in the great centres where coal could easily be brought by canal, as the cost of dragging it over country roads was prohibitive for cheap production. Hence we get a second great migration of industry to the towns near the coal fields. Here child labor was readily available, and a new Act had to be passed in 1819 to meet the case of children who were not apprentices. As steam became more regularly applied the machinery got more complicated and less suitable for children of tender years, and there was a tendency to discontinue them in certain branches. They were still retained in the old water mills and the Factory Acts were never really effective till the invention of the government factory inspector in 1833.

There were practically no people dispossessed by machinery in the cotton trade; instead there were increasing opportunities of employment, but other trades suffered. The demand for both light woolen and linen goods fell off as cotton was substituted. Still the weavers prospered. They continued to work up the yarn in their own homes, and it was not until the dislocation of trade brought about by the Napoleonic wars that they fell upon evil days. Gradually machinery was applied to weaving, and the race of hand-loom weavers died out amid great privations.

It was when machinery was applied to wool, that the real social upheaval came. It destroyed the by-employment of spinning throughout the whole of the country districts, and an elaborate system of relief from the rates had to be devised to assist people over the crisis. This pauperized the whole of the south of England and degraded the agricultural laborers as a class.

The radical change in English life came that the real social upheaval came. It destroyed the old stability. A man had to follow his work to the towns and lost his little farm. Even when the factories were situated in the country he had to work regularly and could not take time off to attend to the garden as he could when working for himself. The regularity of the life, the tyranny of the factory bell, and the loss of independence were the things of which the worker most complained. The early factories, situated as they were in the country districts, laid the workmen open to an appalling system of payment in kind called "truck," an evil only gradually remedied by a series of Acts of Parliament beginning in 1831, and extended in 1887 and 1896 to all manual workers except domestic servants.

But more important than his dependence on his treatment by the master was the dependence of the workman on the state of trade. The sufferings during the Industrial Revolution in England were especially violent owing to the Continental System of Napoleon which shut out English goods from Europe except by smuggling between 1806–1812, and which was followed by the rupture with the United States, which cut off another very important market. After the peace of 1815 the utter exhaustion of the continent made Europe a bad customer, and England, equipped as she now was for production in bulk, suffered accordingly. The coming of machinery would have been a difficult time for any country, but the troubles were enormously aggravated owing to the fluctuations of trade and the depression after the war. English exports decreased in value between 1815 and 1825, and only began to recover about 1835, and to make a rapid advance in 1840. Nevertheless the increase in trade when compared with that of 1750 was enormous.

The exports in 1750 were valued at £12,699,081; in 1880 they were £34,381,617; in 1840, £116,479,678. The imports in 1750 were £7,772,039; in 1800, £28,257,781; in 1840, £67,432,964.

The growth in the import of raw cotton is very striking. In 1751, 2,976,610 pounds were imported; in 1815, 99,306,343; in 1830, 259,856,000.

The import of wool could not expand till the Australian wool became available. In 1800 the number of pounds imported was 8,609,000; in 1840, 49,436,000; in 1857, 127,390,000.

Then the English fiscal system had to be overhauled to get in cheap raw material, and the agitation of the manufacturers was successful in bringing about the free trade era.

During the 19th century the English Parliament was mainly occupied in readjusting the relations of employers and employed, in facilitating the growth of a manufacturing state, and in abandoning the system which was made for an agricultural state; while no attempt has been made to preserve any balance between agriculture and industry.

The result of the industrial revolution in England was, to use the words of an 18th century writer, "to remove multitudes of people from our natural and fixed basis, land, to the artificial and fluctuating basis, trade." See also INDUSTRIAL REVOLUTION.

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33. BRITISH TRADE UNIONISM. English Trade Unionism is an indigenous product, which has remained singularly uninfluenced by any foreign movements or ideas. Disregarding the analogous combinations among journeymen during the Middle Ages, which in England seem to have been usually intermittent and temporary, and also the mediæval guilds of master-craftsmen and merchants — between which and modern Trade Unionism no actual affiliation or connection has yet been traced — we may say that Trade Unionism, in the sense of durable combinations of wage-earners for the purpose of maintaining or improving the conditions of their employment, have existed continuously from the latter part of the 17th century. The earliest actual records known to us of such a combination is that of the woolen workers of the southwest of England, which is mentioned as existing in 1700, and frequently referred to in Devonshire, Somerset, Wiltshire, and Gloucestershire throughout the 18th century. The London tailors, too, can be shown to have been in continuous combination from at least 1720, when an Act of Parliament was passed to restrain them. Other Trade Unions known to have existed in the first half of the 18th century were those of the woolcombers, woolstaplers, and silkweavers. It was, however, apparently during the last quarter of the 18th century, when industrial conditions were being revolutionized in so many trades by the introduction of machinery, the factory system, production for export and the use of water or steam power, that Trade Unionism first became widely prevalent. Since that date, it is notable that the aggregate membership of Trade Unions in the United Kingdom has, with a number of temporary suspensions, persistently increased, until it now (1917) exceeds 4,000,000; organized in 1,100 different societies, possessing funds exceeding £6,000,000. As an institution Trade Unionism has, during the whole two centuries, and especially since 1824, when the first legalizing statute was passed, steadily increased in solidity, and continuously improved in its temper toward society and in the economic character of the methods employed to gain its end. In all these respects the improvement during the last 40 years has been most marked. Whatever may be the casual connection, if any, the historian cannot but record the fact that the character of English Trade Unionism has varied from decade to decade in close correspondence with the variations of the treatment which the community accorded to it. So rapidly and certainly has an improvement in English Trade Unionism followed upon measures of legalization and tolerance that were it not that it would seem to palliate inexcusable outrages of past times, we should be tempted to the epigram that each generation of citizens and the employers in each trade in each generation have the Trade Unionism that they deserve!

The form which Trade Unionism takes among the English wage-earners (and we may ignore for present purposes the Trade Unionism of other classes, such as lawyers, doctors, architects, accountants, surveyors, actuaries, teachers, etc.), is that of a voluntary association among the persons engaged in a particular trade, based upon the payment of weekly contributions — varying from two pence to two shillings — to a common fund which is administered by an elected executive, bound by an elaborate code of rules, and controlled by referendum votes of the entire membership, in such ways as are believed to promote the objects of the members. These objects are, first and foremost, the maintenance and progressive improvement of the conditions of employment of the wage-earners in the trade concerned, including not only the amount of wages, but also the method of remuneration, the form of the agreement, the hours of labor, the sanitation, safety and comfort of the operatives, and all the other conditions, explicit or implicit, of the wage-contract. Auxiliary to this fundamental object, and always subordinate to it, are the various «friendly benefits» afforded to members, which may include maintenance payments to members out of work, whether from strikes or lockouts, or merely from slackness of trade; sick pay; funeral benefit on death of member or member's wife; accident benefit; insurance of tools against loss by fire or otherwise; legal assistance to members in litigation especially as regards compensation for accidents, and so forth. It is especially in the durability and financial solidity of the association, the multiplicity and amount of their friendly benefits, and the magnitude of their accumulated funds, that the principal English Trade Unions surpass those of all other countries. There are great Trade Unions (such as the Amalgamated Society of Engineers) which habitually enjoy an annual income of £4 per member; there are others (such as the Amalgamated Cotton Spinners) which possess accumulated funds exceeding £23 per member; there are others, again (such as the Boilermakers), which disburse on sick pay and medical attendance alone, more than £50,000 a year, including no less than £8,000 as salaries to the doctors in their employment. Among them all, the Trade Unions expend more than £400,000 annually in pensions of 5 to 12 shillings a week to their aged members, and nearly £120,000 in payment of their funerals; while a sum varying according to the state of trade from £400,000 to £1,000,000 is annually paid to members out of work, only from one-sixth to two-fifths of this, according to the state of the labor market, being for anything that can be called strikes or industrial disputes. But this strong financial position and these substantial friendly benefits are confined to the well-known leading Trade Unions. Out of the 1,100 separate trade unions, there are 24 owning more than £50,000, which together possess three-eighths of the aggregate total of members and four-fifths of the accumulated funds of the whole movement.

The fundamental principle of English trade unionism is the necessity, in modern industrial and social conditions, for the establishment and enforcement of a common rule, with regard to the conditions of employment. Without the enforcement of such a common rule trade unionists assert that the operation of competition is inevitably to degrade the conditions of employment irrespective of the profitableness of the industry or the wealth of the country as a whole; eventually forcing down the remuneration of the lowest and weakest wage-earner to the very minimum on which he can manage to exist from day to day (far below the level for healthy subsistence); requiring him to labor for excessive hours, and exposing him to unsanitary, dangerous and brutalizing conditions of employment. Toward such a morass of «sweating,» demoralizing to the workers themselves, and economically as well as socially disastrous to the community as a whole, the unrestricted competition of the labor market is always forcing out not only the weaker members, but also through the competition of these, the entire wage-earning class. In confirmation of this analysis, the English Trade Unionists point to the state of millions of workers in every industrial country, the United States and Japan affording quite as striking demonstrations as England and the continent of Europe. Its essential accuracy is, indeed, now asserted by the economists of to-day, and mathematically demonstrated (consult 'Industrial Democracy' by S. and B. Webb, 1911); and accepted in such measures of modern statesmanship as the Trade Boards Act (1907), and the minimum wage legislation of Australasia and the United States.

Against this persistent tendency of industrial competition in the labor market, the modern economist or statesman establishes, in the interest of the community as a whole, the Common Rule of standard minimum conditions, designed to prevent the wage-earner being subjected, even with his own consent, to conditions of employment likely to impair his health, undermine his strength, or demoralize himself or his family. This is the philosophy of Factory Legislation, as yet only imperfectly applied in any country, but advancing in all; as yet restricted in the main to women and children, and to their hours and sanitation, but now increasingly extending to wages and other conditions, and to adult men. The maintaining, extending and enforcing of Factory Legislation is one of the principal expedients used by English Trade Unionists (especially the textile operatives, the coal miners, the railway workers and the shop assistants) for obtaining the protection of the Common Rule. Such legislation has been carried to its fullest extent at present in New Zealand and Australia. (Consult 'State Experiments in Australia and New Zealand' by W. P. Reeves).

The second expedient used by English Trade Unionists is that of Collective Bargaining. Instead of each wage-earner making his own bargain with the individual employer, the Trade Union aims at making common terms for the operatives as a whole, with the whole of the employers. Examples of such Collective Bargains are the "Working Rules" which govern the building trades in nearly every English city; the elaborate hierarchy of agreements of the iron-shipbuilding trade; or the highly evolved lists of prices of the cotton industry. This does not mean (as often ignorantly asserted) that Trade Unionism implies, or that Trade Unionists desire, that all workers should be paid alike. The mere fact that a large majority of the English Trade Unionists (including the strongest and ablest of them all) absolutely insist on piecework as the very basis of their Collective Bargains, and would instantly strike against any attempt to introduce wages by the hour or by the day, proves that equality of earnings is not their object. What they do aim at is equality in the rate of pay for a given unit of work; though even here their aim is only to secure for every worker as a minimum the standard rate for the work done. No objection is made to more than the minimum rate being given, provided that this is not done in such a way as to bring other workers below the minimum. Collective Bargaining, more or less universal throughout the trade, is now the prevalent practice in all the principal manufacturing industries of Great Britain and it is, to the economist, a notable fact that it prevails most universally and is most strictly enforced, just in those industries, such as cotton spinning and shipbuilding, in which British industrial supremacy is most demonstrable.

The third expedient of English Trade Unionism is Mutual Insurance. By bringing to the support of the individual workman, in any time of economical weakness, the aid of accumulated funds, he is enabled to stand out against the terms offered by the employer, and wait until better terms are conceded. It is with this object, and not primarily from any compassionate or humanitarian feeling, that English Trade Unionists have so generally united the well-known "friendly benefits" with their trade combination. The large accumulated funds of some of the English Trade Unions, amounting sometimes to £25 per head of membership, afford valuable assistance in their Collective Bargaining for better conditions, by making possible the final arbitrament of the strike. But they do more than that. In small and closely unit trades, where the operatives are sufficiently self-restrained and intelligent, what we have called the strike in detail may be an effective weapon. There may even be no overt Trade Unionism. The employer may refuse to recognize the Union, or the law may make corporate action dangerous. There may be no attempt to prevent the employer filling his vacancies. But if the men in the trade are strongly combined, the employer may find that he cannot keep any man more than a week or two. Each man in succession leaves in silence before he has well settled down to his work, leaving the employer to find out for himself in what way the conditions which he is offering offend against the undivulged Common Rule. Such a strike in detail is out of the power of any but a small, skilled, strongly combined, highly intelligent, and rich Trade Union having an elaborate Mutual Insurance. But with such a Union experience shows it to have often been more efficacious in maintaining the Common Rule, than the most turbulent of mass strikes.

During the 20th century the Trade Union Movement has more and more consciously striven to assert the right of the workers collectively, not merely to maintain and defend their standard of life, but also to exercise control of the industry in which they live (consult 'The World of Labour,' by G. D. H. Cole, and 'National Guide,' edited by J. Orage); at any rate in so far as concerns the conditions under which they spend their working lives.

The English Trade Unions form, with the analogous associations into which the employers in the principal trades are now brigaded, elaborate organizations — based, in the best cases, on mutual discussions in joint committees, investigation by neutral accountants and the joint application of principles by the salaried officers of the employers and of the workmen respectively — for Collective Bargaining, the settlement of standard piecework lists, scales of wages, and other general minima of the conditions of employment to be observed throughout the trade; for the application of these formal agreements to the varying circumstances of particular districts, particular establishments, particular branches of work, and even particular jobs; and also for the revision of these general agreements and the settlement by arbitration of the disputes that from time to time inevitably arise. Within each establishment there is often a Workshop Committee or a number of "shop stewards," elected by all the men employed, negotiating with the management. This elaborate machinery for determining, irrespective of the will or caprice of individual employers or individual operatives, the minimum conditions on which the whole trade shall work, is most highly organized in the cotton spinning and manufacturing, coal mining and shipbuilding industries, together with some smaller trades, such as the brassworkers, lacemakers, and compositors.

The Trade Unions have, however, further organizations of their own. The local branches in each town are united for mutual support in Trade Councils, of which there are now over 330. These organizations are of little financial strength, and chiefly of moral support. More substantial are the great federations, of which the principal one, the General Federation of Trade Unions, now includes over 140 Trade Unions with 900,000 members, and large accumulated funds. This has for its object the mutual support of its constituent unions in industrial disputes. Another federal body, the Federation of Engineering and Shipbuilding Trades with 600,000 members (including most of those in the General Federation), has for its principal object, the prevention and settlement of the disastrous disputes that occasionally break out between one set of workmen and another as to the «encroachments» by one trade on another, and the proper «demarcation» of their several pieces of work. A third body, the Miners' Federation, is composed of practically all the coal mining Trade Unions, and has, beyond mutual support, principally for its object the obtaining of additional Mines Regulation Acts, especially the maintenance of the eight-hour law (secured in 1908) and the enforcement of the Coal Mines (minimum wage) Act (secured in 1912). But the Miners' Federation (like some other so-called federations) is more and more becoming a strongly centralized Trade Union, so far as policy and political action is concerned, the federal form being retained chiefly as a means of securing efficient local organization.

The relative proportion which Trade Unionship members in the United Kingdom bears to the wage-earners as a whole, is often much misunderstood. The four millions of Trade Unionists amount to only one in four of the whole. What is, however, obscured by the statement is that the vast mass of the wage-earners belong to occupations in which Trade Unionism does not exist, or exists only in rudimentary form — such, for instance, as the agricultural laborers, the unskilled laborers in urban districts and the domestic servants, or the large numbers who work in one or other form as independent producers, such as the jobbing craftsmen, the tin and copper mines, the home-working seamstresses, etc. Women workers, generally, including all the factory population, count only 400,000 Trade Unionists out of some six millions of women industrially employed. A more correct way to estimate the strength of Trade Unionism is to take the proportion of Trade Union membership to the adult males employed at wages in particular industries. In many cases, such as the boilermakers, the cotton spinners, the lacemakers and the coal miners, it would be found that over whole districts of England every operative actually employed was a Trade Unionist. In such industries, indeed, Trade Unionism is as universally compulsory as citizenship, and is enforced by as little conscious pressure. It is taken for granted by every workman, as it is by every employer. The whole industrial organization is adjusted to it, with the result that it becomes as imperceptible as the weight of the atmosphere. On the other hand, there are great industries, such as the building and engineering trades, in which, while strong Trade Unions exist, are whole districts in which a majority of the workmen remain outside the unions, not caring to pay the weekly dues; and usually in every town some establishments which employ indifferently both Unionists and non-Unionists. To the economist it is significant that it is precisely in those industries in which Trade Unionism is virtually universal and compulsory — among them being particularly cotton spinning and shipbuilding — that both technical processes and the use of machinery have been most advanced, and both industrial efficiency and financial success have been most conspicuous. In contrast stand the «sweated» industries, low grade in quality in their nature, and curiously unstable in their position in the world-market. In these industries neither Trade Unionism nor effective Factory Legislation exists.

The most marked characteristic of British Trade Unionism during the decade 1905–15 was its increasing attention to Parliamentary action, and the creation of an effective Labor Party. Political action had, for a whole century, been one of the weapons of Trade Unionism, notably among the cotton operatives and coal miners; and Trade Unions have openly spent money on electioneering, and have maintained their own members in Parliament since 1874, at any rate. An «Independent Labor Party» was formed in 1893; the Trades Union Congress took action to reform such a party on a broader basis in 1899; but it was not until the Taff Vale case (a legal decision which made Trade Unions henceforth liable in damages for any action of their officers, as if they were corporate bodies, although they were not allowed the privileges of corporate bodies) that the matter was energetically taken up. At the general election of 1906 no fewer than 50 candidates were run by the Labor Party, and 29 of them were successful. Since that date there has been continuously in the House of Commons a separately organized party, in 1916 numbering 40 members, representing «The Labor Party,» which is itself a federation of trade unions, trades councils, Socialist societies and co-operative societies, counting altogether over two million members. The Labor Party in Parliament has obtained the enactment of the Trade Union Acts, 1906 and 1912, which restored the Trade Union immunity from litigation affecting their corporate funds and the Trade Union right to subsidize political action, both of them impaired by judicial decisions (the Taff Vale Railway and Osborne cases). The influence of the Parliamentary Labor Party has been seen also in the quickening of radical policy in social and economic questions, resulting in the provision of old age pensions, meals for necessitous children at school, a legal minimum wage for sweated trades, the eight hours day and a legal minimum wage for coal miners, a more effective «fair wages clause» in all government contracts, labor exchanges to diminish unemployment, more drastic progressive taxation of incomes, and the National Insurance Act, covering sickness, maternity, accidents, unemployment and permanent disability. Soon after the outbreak of war in August 1914, when the Liberal and Conservative parties united to form a Coalition Ministry, the Labor Party was invited to join as a separate entity, and its leader, Mr. Arthur Henderson, became a member of the cabinet.

Bibliography.— The principal authorities are the 'Annual Reports' of the Board of Trade (Labor Department) on Trade Union Statistics, Collective Agreements, Rates of Wages, and on Strikes and Lockouts, together with the Annual Reports of the Chief Registrar of Friendly Societies (those relate only to registered Trade Unions). For the history, consult 'The History of Trade Unionism' by S. and B. Webb (1911 edition), and (as to origins) also 'Industrial Organization in the 16th and 17th Centuries,' by George Unwin (1904). For an elaborate economic analysis of every form of Trade Union activity, consult 'Industrial Democracy,' by S. and B. Webb (edition of 1911); also 'Methods of Industrial Remuneration,' by D. L. Schloss; 'Industrial Peace,' by L. L. F. R. Price; 'The Case for the Factory Acts,' edited by Mrs. Sidney Webb, with preface by Mrs. Humphrey Ward. The latest works of importance are 'The World of Labour,' by G. D. H. Cole (1915); and 'Trade Unionism,' by C. M. Lloyd (1915); consult also the elaborate details in 'The Labour Year Book' (1916). For the case against Trade Unionism, from the standpoint of the individualist employer, consult 'Trade Unions and Industry,' by E. A. Pratt.

SIDNEY AND BEATRICE WEBB,
Joint authors of 'The History of Trade Unionism'; 'Industrial Democracy'; 'Problems of Modern Industry.'

34. THE LABOR MOVEMENT IN POLITICS. The greatest politician of the last century, W. E. Gladstone, writing in 1892, expressed the opinion that «The labor question may be said to have come into public view simultaneously with the repeal of the Combination Laws,»— that is about 1825.

Accepting this authority, we may divide the 90 years that have since elapsed into three periods, dominated not as might be expected by three but by two ideas. From 1825 to about 1850 labor, when it fought at all, fought under its own flag, and disdained alliance with any other party. From 1850 to 1900, partly owing to the dominating personality of Mr. Gladstone, political labor for the most part joined hands with Liberalism. In 1900 the banner of independence was raised once more, and has already attracted the greater part of the political forces of the proletariat.

The First Period of Revolt.— Up to 1832 the Government of England was an irregular oligrachy rather than a democracy. The House of Commons, which then as now exercised supreme control, was elected in a haphazard fashion. A few members represented large democratic constituencies; many were elected by some scores or hundreds of voters; many others were practically nominees of individual landowners or of the Crown. Labor scarcely aspired to political rights; all it asked was relief from coercive legislation and excessive taxation. The populace, of course, supported the reformers of 1820–32, and it was fear of revolution which forced the House of Lords to consent to the passage of the Reform Bill.

Nearly the first work of the reformed Parliament of 1832 was the amendment of the old Poor Law, which had reduced the agricultural laborers of southern England almost to the condition of serfs, owned not by individuals, but by their parishes. The abolition in 1834 of the system of indiscriminate outrelief was intensely unpopular, and this, combined with the memories of the recent reform agitation, and with the teachings of Robert Owen (q.v.), who had promulgated many of the doctrines of modern Socialism, led to the Chartist movement, the first distinctively working class political agitation in modern England. See CHARTISM.

«The People's Charter,» drafted by Francis Place, the radical tailor, was issued in 1838. Its six points were universal (i.e., manhood), suffrage, election by ballot, payment of members, annual parliaments, equal electoral districts and the abolition of property qualification for members. This purely political program gathered to itself the whole of the working class discontent which hitherto had taken other forms. In 1839 the north of England was saved from a revolutionary rising by the ability of Sir Charles Napier; and Chartism was crushed by the imprisonment of its leaders. It survived till 1848, when the continental revolutions fanned it again into flame, but it expired after the failure of a monster meeting at Kensington, London, which was to inaugurate the British revolution. Meanwhile the agitation for the abolition of the Corn Laws, which was successful in 1846, had attracted to the Liberal party a great measure of labor support, and with the disappearance of Chartism, the first period of revolt terminated.

Labor in Alliance with Liberalism.— The abolition of the Corn Laws was followed by a series of years of expanding trade and growing wealth; the narrow Whig oligarchy was gradually replaced by a broader Liberalism which conferred the suffrage on the workmen of the towns in 1867, and on those of the rural districts in 1884. John Bright (q.v.), the tribune of the people, and Joseph Chamberlain (q.v.), the idol of radical Birmingham, were the real leaders of the working classes up to 1886, and Gladstone generally held their allegiance from 1868 till his retirement in 1894. The trade unions had during this period established themselves as national institutions, and the standing Parliamentary committee of their annual conference was in constant friendly communication with Sir William Harcourt (q.v.), Sir Henry James (now Lord James) (q.v.), A. J. Mundella and other leading Liberals. George Odger was one of the first working-class aspirants to Parliament, but he died before the day of victory. In 1874, Thomas Burt (q.v.), the Northumberland miner, was elected for Morpeth, a position he still retains in 1916, and his remarkable career has been honored in his old age by the high dignity of a seat in the Privy Council. In the same election another Labor candidate, Alexander Macdonald, was successful. At first the Liberals opposed these upstarts; but their claims were soon admitted, while their harmless respectability and valuable special knowledge were generally acknowledged. Eleven Trade Unionists were elected in 1885; in 1886, 9; in 1892, 15; in 1895, 12; 3 more were successful at bye-elections between this date and 1900; there were 52 in 1906, and only 39 in 1916. Meanwhile Henry Broadhurst, a stone-mason, was appointed Parliamentary Under-Secretary of State for Home Affairs in 1886, and Thomas Burt, the miner, was Parliamentary Secretary to the Board of Trade from 1892 to 1895.

It may be said that almost all these men were elected as Liberals. The distinction between them and the others of their party was that they had been manual workers, they had entered Parliament as nominees of their fellow workmen, and usually their election expenses were paid and their maintenance was provided by the funds of their trade unions. But in fact the classification, though definite, is not determined by any one factor. Working men were elected during this period in considerable numbers to town councils, school boards, county councils and other local governing authorities, and many were appointed justices of the peace, that is members of the unpaid courts of first instance.

The New Revolt.— The origin of the revival of independence in politics dates from 1884, when the modern Socialist movement began in England. In this year the Social Democratic Federation, founded a short time before by H. M. Hyndman, became distinctively socialist, and the adhesion to its ranks of William Morris (q.v.), the poet and artist, brought it into immediate prominence. Several Socialist candidates were put in the field at the election of 1885, but they all failed to secure more than a few dozen votes, except John Burns, (q.v.), who polled 598 votes at Nottingham, but, of course, was defeated.

From this time onwards the Socialist party made slow but steady progress. The Fabian Society, founded also in 1884, devoted itself to adapting the principles of socialism to English political conditions, and in 1893 the late J. Keir Hardie (q.v.) (Ayrshire Miners), who had been elected to Parliament for West Ham, near London, the year before, founded the Independent Labor Party, a socialist body whose object was to promulgate a form of socialism more acceptable to British trade unionists than the doctrinnaire and revolutionary gospel according to Marx, which was then expounded by the Social Democrats.

Here we must turn aside to make one point clear. The Independent Labor Party (commonly called the I. L. P.) is a small, though influential, socialistic body, which has some 60,000 members. It must be carefully distinguished from the Labor Party which is before all things independent, as well as from the Labor Party in its wider sense. This important distinction is constantly neglected even in the best-informed London press.

During the 15 years prior to 1899 the Socialist societies kept up a constant agitation for the direct and independent representation of labor in Parliament, with a certain measure of success. John Burns was elected in 1892 for Battersea as an independent attached to no party. Keir Hardie, after his election, carried his independence even further, but lost his seat in 1895, and was not re-elected till 1900. But only one member ever got in on a purely Socialist ticket for a few months in 1910 — Victor Grayson. Meanwhile the trade unions had been gradually permeated with the new spirit, and in the autumn of 1899 at their Plymouth conference, a resolution was carried instructing their executive to call a conference of trade unions and Socialist societies in order to form a new body for the promotion of labor representation. This conference met in London in February 1900, and the Labor Representation Committee was then founded with a membership (at the close of the first year) of 376,000, of whom less than 23,000 were Socialists and the rest trade unionists.

The new body (which in 1906 altered its name to the Labor Party) consisted of a federtion of trade unions, trades councils (that is the local organization of trade unionists in each town), and the three Socialist societies, of which, as previously mentioned, the Independent Labor Party is one. The Social Democrats, however, withdrew a year or two later. At the general election of 1900, the Labor Representation Committee, as it was then called, put 15 candidates into the field, but it was only a few months old; the Conservative Party, asking a vote of confidence from the country while the South African War was in progress, won an overwhelming victory, and the Labor Party was not ill-pleased to score two wins, Keir Hardie at Merthyr and Richard Bell (a railway man) at Derby. During the next five years it won three sensational bye-elections, but Mr. Bell dropped out, and at the dissolution the new party numbered four. Mr. Bell's defection was due to a change in the policy of the body. It was first formed to create a «group»; it was determined that candidates supported by the Labor Representation Committee might ally themselves on other questions with the existing parties; that independence should be limited to labor questions alone. Against this policy a constant internal struggle went on till the Newcastle conference of February 1903, when the extremists won an overwhelming victory, and thenceforward the watchword was complete independence of all other political parties.

There are two chief reasons for this policy. One, of course, is distrust of the Liberal Party which is largely middle-class, controlled by wealth, and in league with a section of the aristocracy. It is not necessary to discuss how far this distrust is well founded, because it is undeniable that the Liberal Party, as at present constituted, must consider other interests as well as those of the workers. The other reason is more cogent. If labor makes any political alliance it must be with the Liberals. Once indeed the secretary of the cotton-operatives was a Tory candidate for Oldham, but he lost the seat for his party, and he is the only exception to the otherwise unbroken rule that labor alliance means alliance with Liberalism. But very many trade unionists, especially in Lancashire, are Conservative, or at any rate are strongly anti-Liberal. In fact it was the accession of 103,000 textile operatives that at the Newcastle conference turned the scale decisively for independence. Five years were spent in active preparation. and the long-expected election of 1906 found the Labor Party ready for the fight.

Political Labor in 1916.— Having traced the history of the participation of Labor in politics, we shall conclude with a survey of its present position, which will reveal an extraordinary complexity of organization, and a considerable diversity of ideas.

The most dramatic result of the Liberal victory in 1906 was the appointment of John Burns, engineer, socialist, and trade unionist, to a seat in the Cabinet as president of the Local Government Board, which carries with it membership of the Privy Council.

The representatives of labor in that Parliament belonged to three distinct groups: (1) The Labor Party proper, the group of 30 men who sat in opposition to the government, and in complete isolation; (2) the Miners, of whom there were 13 (besides one or two in the Labor Party), some of whom were elected as Liberals, some as miners simply, who in a few cases fought and beat the official Liberal; (3) the Liberal-Labor men who numbered 11 at the election, but who had since been reduced to 10 by the retirement of Mr. Broadhurst. The Miners and the Liberal-Labor men formed a group within the Liberal Party, and a number of advanced radicals usually co-operated with them. Between 1908 and 1910 they all united with the Labor Party. See POLITICAL PARTIES.

The body holds an annual conference which has exclusive power to alter rules and determine policy. This conference elects the executive committee. Since 1914 the Labor Party has been politically the central Socialist body for Great Britain. Its strength is about 1,500,000. The official organ of the party, *The Daily Citizen,* died of lack of support in 1915.

The political aims of labor are very indefinite. The party itself includes men of divergent opinions, though to a less extent than the others. About three-quarters of its members are Socialists. The remaining quarter declines so to label itself, but it has no definite creed, and constant association with men of strong opinions, who as a rule have studied political and social problems, makes it to say the least, extremely tolerant of Socialism.

The party was long in favor of Old Age Pensions, and of the nationalization of railways and of land. It has advocated state provision of work for the unemployed and of meals for underfed school children; and it strongly supports free trade, a policy on which all sections of labor are united. The attitude of the Labor Party to the Liberal Government again is conditioned by various factors. The party exists by independence, but none the less it was elected largely by Liberal votes.

The Socialist political policy includes the labor policy above indicated, and goes farther on the same lines. It advocates the municipalization of the liquor trade, and more drastic interference with the evil results of competition, such as long hours and overtime, child labor and sweating of women's labor; it favors compulsory arbitration to replace strikes and lockouts; and a more vigorous extension of the sphere of municipal and governmental industry. Some Labor men oppose some of these proposals. Very few would oppose them all.

At present the prospects of the Labor Party are bright. Its leaders are united and harmonious. Moreover, the party has made a name for itself; it is a force to be reckoned with; its action is watched, and its intentions discussed in advance. In every respect the Labor Party member has a marked advantage over his Liberal-Labor rival. On 29 Dec. 1918 complete returns from the elections for the new House of Commons gave the following results:

Coalition.	
Coalition Unionists	334
Coalition Liberals	127
Coalition Labor	10
Total coalitionists	471
Other Parties.	
Unionists	46
Asquith Liberals	37
Labor	65
National Party	2
Socialist	1
Irish Nationalists	7
Sinn Feiners	73
Independents	5
Total of other parties	236
Coalition majority	235
Coalition majority with 46 Unionists	327
Grand Total	707

Prophecy in politics is peculiarly risky, but it is fairly safe to say that the share of labor in the control of the destinies of the empire will be larger in the future than it has been in the past.

Bibliography.— *First and Second Periods.*— The following amongst many may be consulted: Gammage, 'Chartist Movement' (1894); Wallas, 'Life of Francis Place' (1898); Podmore, 'Life of Robert Owen' (1906); Broadhurst, 'Autobiography'; Howell, 'Labor Leaders, Labor Legislation, and Labor Movements'; and also for both periods books on trade unionism and co-operation.

Third Period.— Webb, 'Socialism in England' (Sonnenschein 1893); Noel, 'The Labor Party: What it is and What it Wants' (Unwin 1906); Annual Reports of the Labor Party (London); Annual Reports of the Trade Union Congress (London); Annual Reports of the Independent Labor Party (London); Publications of the Social Democratic Federation (London); Annual Reports of the Fabian Society (London).

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35. THE CO-OPERATIVE MOVEMENT IN GREAT BRITAIN.

The earliest examples of co-operative institutions are the corn mills and baking societies started in the closing years of the 18th century and the first decade of the 19th as a relief from the millers' monopoly and the exorbitant price of flour. At Hull, Whitby, Sheerness, Devonport, and sundry places in Scotland, mills and bakeries were worked successfully on a ready-money, cost-price basis, but they had little effect on the subsequent movement, though Sheerness and a few other societies still exist. The co-operative idea, as we know it, was evoked in the mind of Robert Owen by consideration of the antagonism of classes produced by the industrial revolution with its wide-spread misery among the factory operatives. Failing to persuade his fellow manufacturers to follow his example of humane treatment of his employees, and failing to obtain efficient factory legislation from the government, he devised the plan of organizing the workers into self-sufficient communities, owning and cultivating the land in common and producing commodities for their own use or for exchange with other communities. Two such colonies, at Orbiston in Lanarkshire (1826) and at Ralahine in Ireland (1830–34), nearly succeeded. His followers, who enthuiastically adopted his communist doctrines, started, from 1828 onwards, numerous associations for co-operative trading, which employed their profits in setting their members to work at manufacture on a small scale. To provide a market for the goods so made, Owen in 1832 opened his Equitable Labor Exchange at Gray's Inn in London, where persons leaving goods for sale received in exchange labor-notes based on the average time of production at six-pence per hour. In 1830 there were nearly 300 «Union Shops» with over 20,000 members, and between 1830 and 1835 seven Co-operative Congresses were held. But by 1835 the whole movement collapsed owing to want of legal status, the divergent interests of the members, and the failure of the labor-time principle. The enthusiasm of Owen's followers now overflowed into the Chartist movement.

The second stage in the history of co-operation began in 1844 with the founding of the Rochdale Society of Equitable Pioneers by a group of Socialists, Chartists and Trade Unionists, who found the motive in the failure of a strike among the flannel weavers. Its objects were the sale of provisions, etc., the building and buying of houses for members, the employment of out-of-work members in manufacture, the purchase of an estate to be cultivated by members out of work or underpaid, «to establish a self-supporting home colony of united interests,» and to start a temperance hotel. Cash payment and good quality were principles shared with the older movement, but the new departure on which the success of co-operation was to turn was the surrender of the attempt to sell at cost price. In lieu thereof Charles Howarth introduced the system of dividing profits upon purchases, and from that moment co-operation has never ceased to prosper. This system took the government of the society out of the hands of founders or shareholders and transferred it to the customers, that is to the general co-operative community. The rules for the organization of a Co-operative Society have remained substantially the same as those of the original Rochdale Society. To quote one example: «The object of this society is to carry on the trade of dealers in food, fuel, clothes, and other necessaries, and manufacturers of the same; the trade of general dealers (wholesale and retail); including dealings of any description with land, and the trade of builders.» Membership is free to all, and each member must hold a fixed minimum of one-pound shares, one to five, carrying interest at 4 or 5 per cent. The maximum investment is £200, and each member has one vote only, whatever his holding of shares. The quarterly general meeting of the society is the governing body, but the management is in the hands of the committee, generally elected for a year, half retiring each six months. The secretary is elected for a year by the general meeting, but is the servant of the committee, which appoints all the other officials and workpeople. The shares can be withdrawn but are not transferable and therefore have never more than their face value. The business of the store is transacted in the same way and at the same prices as ordinary shopkeepers, and after interest has been paid the profits are divided among the customer-members in proportion to their purchases. Metal tokens or paper checks registering the value of each purchase are given to the buyer, and are collected periodically and credited to him. Non-members are allowed half dividend. Out of the profits a bonus is sometimes paid to labor and grants made for educational and charitable purposes.

The co-operative movement now grew with exceeding rapidity. In 1862 the total sales of all the societies of all kinds in the United Kingdom amounted to £2,333,523; in 1870 to £8,201,685; in 1880 to £23,248,314; in 1890 to £43,731,669; in 1900 to £81,020,428. In 1914 there were 1,524 retail societies with 3,096,314 members, a total capital of £64,803,071; total sales of £164,587,520, and profits of £15,140,960. The obvious advantages of buying in large quantities led to the formation of the North of England Co-operative Wholesale Society in 1864 which in 1874 amalgamated with a similar metropolitan body to form the Co-operative Wholesale Society of England, with headquarters at Manchester. Only societies can be members and each member-society must take up one five-pound share for each 10 of its members, such shares being transferable at par. The general committee of 16 sitting at Manchester governs the society with the assistance of two branch committees of eight each at Newcastle and London. The final authority resides in the quarterly meeting, which, for sake of convenience, is held in three parts at Manchester, Newcastle and London, each member-society being entitled to one delegate for each 500 members. Questions are settled by the total votes at the three meetings. Goods are sold at slightly over cost price and the profit divided among the purchasing societies in proportion to their purchases. The Scottish Co-operative Wholesale Society, established in 1869, is similarly managed, but the member-societies have one vote in virtue of their membership, one vote for the first £1,000 of purchases, and one vote for each additional £2,000. A bonus is paid to employees at the rate of twice the purchasers' dividend. The two Wholesale Societies do not compete but act as each other's agents. There are sale depots at Leeds, Nottingham, Blackburn, Huddersfield, Birmingham, Leith, Kilmarnock and Dundee, and buying agencies in Ireland, Denmark, Germany, Spain, United States, Canada, etc.

Besides buying and selling at wholesale, the Wholesale Societies carry on a large amount of manufacture — boots and shoes, candles, woolens, clothing, furniture, brushes, upholstery, bedding, butter, flour, lard, jam, tobacco and printing by the English Society; flour, tweeds, blankets, tailoring, shirts, mantles, furniture, boots and shoes, hosiery, brushes, preserves, confectionery, tobacco, fish-curing and printing by the Scottish Society. The two societies own tea plantations in Ceylon, and the Scottish Society purchased a tract of land in Canada for wheat growing. The English Society conducts a banking department for the distributive stores. The Co-operative Newspaper Society is another federal institution owned by co-operative societies. It publishes the *Co-operative News*, the weekly organ of the movement. The Co-operative Insurance Society is another «society of societies» doing mainly fire insurance of society buildings, £22,000,000 of property being so insured. The United Baking Society of Glasgow (capital £130,372), and eight corn mills (capital £347,071), are also productive societies, federations of ordinary stores. Production to the amount of several millions sterling is carried on by ordinary distributive societies, mainly in flour and baking, 19,456 persons being employed in production, and much activity is also shown by many societies in building houses to be sold or leased to members. The total investments of the stores in «house property» (including presumably their own buildings) is over seven millions sterling.

A large section of co-operators has always held that co-operation, which did not include a co-partnership with labor, was only a masquerade. To the Owenite communities succeeded the Redemptionist Societies «for carrying out the practice of associated labor,» which had a brief life about 1850. The Christian Socialists — Kingsley, Maurice, Ludlow, Neale — in 1848–52 established some twelve «self-governing workshops» in which the employees were to supply capital, management and labor. Next in the early sixties came the «Oldham Coops.,» joint-stock cotton spinning companies in which the shares were mainly held by operatives, but they degenerated into ordinary companies. Efforts at founding manufacturing societies were persistent, and the wholesale and distributive societies and trade-unions lost large sums of money; 275 soceties established before 1880 were extinct in 1882, leaving only eight corn-mills and 25 other societies. In 1884 the Labor Association was founded to promote productive societies on the basis of a co-partnership of labor and capital, the workers being entitled of right to a share of profit and being at liberty to invest their savings in shares. The mortality among societies continued high despite brisk propaganda — 139 societies disappearing between 1880 and 1898. The Co-operative Production Federation was started to aid the societies with capital and prevent overlapping. A new branch of activity is the «Co-partnership Tenant's Movement» for building and owning houses, which has established since 1888 many co-operative colonies; there are now eight societies, of which four are active with £82,600 capital. In agriculture there were 906 registered societies with a capital of £1,031,397; they consist of farmers and small holders, buy seed and manures and sell produce for their members. On the whole they belong to a different class from the ordinary working-class societies. Finally, there is to be mentioned the Co-operative Union, started in 1869, which carries on propaganda through its district committees and the United Board formed of representatives of the sectional boards. It is also the parliamentary organ of the movement and devotes much labor to organization and education. Its headquarters are in Manchester. Under its auspices is held an annual congress of co-operative societies at which matters of interest to the movement are discussed, but the resolutions carried thereat have no mandatory force. The Woman's Co-operative Guild, started in 1883, has nearly 600 branches and 31,500 members; it has done much education work among woman members of stores and has been specially active in organizing special stores in very poor districts. Its principal work is devoted to the housing question, anti-credit, divorce law reform and citizenship campaign. There is also a Woman's Co-operative Guild in Scotland, which has 174 branches and over 12,500 members. The International Co-operative Alliance for the promotion of co-operation throughout the world, is a federation of organizations in Great Britain, Germany, France, Italy, Austria, Hungary, Switzerland, Belgium, Denmark, Holland, Russia, Canada, India, the United States, etc. Congresses are held in different European cities every two or three years.

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36. BRITISH FACTORY LEGISLATION. In the year 1784 there raged at Radcliffe, near Manchester, an epidemic fever in the cotton spinning works, where long hours of labor and a total absence of sanitation had undermined the strength of the juvenile operatives. The conditions of work in the Radcliffe mills were not worse than those prevailing throughout the neighboring industrial district, in which the new factories were multiplying fast. The epidemic of fever was but one among many similar epidemics. But when, at the request of the Lancashire justices of the peace, this particular outbreak was investigated by a committee of Manchester doctors, and when the leading physician among them, Dr. Thomas Percival, and the chairman of the Quarter Sessions, Thomas Butterworth Bayley, persuaded their fellow magistrates that the gravity and rapid diffusion of the sickness really arose from the «putrid effluvia» of the «numbers crowded together» in the new mills, and the «injury done to young persons through confinement and too long continued labor,» they were close to the discovery of the great device of factory legislation. At once the Manchester justices, who were not at that date pecuniarily interested in cotton mills, decided henceforth to refuse to allow the «indentures of parish apprentices whereby they shall be bound to owners of cotton mills and other works in which children are obliged to work in the night, or more than 10 hours in the day." In 1796 Dr. Percival and his friends definitely formulated certain resolutions, in which they again drew attention to the physical and moral evils of excessive hours of labor, of the unsanitary conditions of the factories and of night work; and in which they proposed, "if other methods appear not likely to effect the purpose," that Parliament should enact "a general system of laws for the wise, humane and equal government of all such works." Here we have expressly suggested the expediency of factory legislation. Within half a dozen years the first tiny instalment of that legislation — the "Health and Morals of Apprentices Act, 1802" — had, at the instance of the greatest mill owner of the time (Sir Robert Peel), passed into law. This experimental legislation of 1802, expanded by Robert Owen in 1815 into a general principle of industrial government, and applied in tentative instalments by successive generations of unwilling statesmen, has spread to every industrial community in the Old World and the New. Of all the 19th century inventions in social organization, factory legislation is the most widely diffused. The opening of the 20th century finds it prevailing over a larger area than the public library or the savings bank; it is, perhaps, more farreaching if not more ubiquitous, than even the public elementary school or the policeman.

It is sometimes said that England has lost the lead in factory legislation; that New Zealand and several of the Australian states now outstrip her; and that in one respect or another France, Germany, Switzerland, and even Austria, surpass the United Kingdom in the protection of labor. This is not the place to examine into the accuracy of these assertions. It is by no means easy to ascertain, even from the laws of a country, exactly what national minimum it proposes to enforce, in all the varied circumstances of place and process, age and sex. Still less easy is it to discover to what extent the law is really obeyed and enforced. Though the policy of a national minimum is, in the United Kingdom, as yet inadequately embodied in law, and still imperfectly enforced, yet it may well be that the scope of the factory legislation is, taken as a whole, and as applied in actual practice, more extensive than that of any other state.

What is often overlooked is that the law on the subject is in the United Kingdom, not contained in any single code, or in any one act of Parliament, but has to be collected from among eight different branches of English law. There is first the law as to sanitation, which applies to factories as to other places, and is administered by the town council or other local governing body under the supervision and, more or less, the control of the Local Government Board. With this we may name the law as to education, with its incidental restrictions on the employment of children under 14, and as regards certain classes of young persons even up to 16, enforced by the town and county council under the supervision of the Board of Education. It is partly in connection with education, too, though partly also in connection with the prevention of cruelty to children, that the town and county councils are empowered to make by-laws, subject to the approval of the Home Office, regulating or prohibiting the employment of children and young persons under 16 in certain occupations. The law regulating the conditions of employment as such is itself scattered over six distinct series of acts of Parliament, relating respectively to (a) factories and workshops generally, including all manufacturing industries, laundries, docks and works of engineering; administered partly by the Home Office itself and partly by the local governing bodies under the Local Government Board; (b) mines, administered wholly by the Home Office; (c) retail shops, administered wholly by the local government bodies, under the Local Government Board; (d) ships, and (e) railways, both administered wholly by the Board of Trade; and, finally, (f) the industries subjected to the Trade Boards Act (such as tailoring, boxmaking, chain and nail making, confectionery, etc.), in which a legal minimum wage is enforced by the Board of Trade.

The principle underlying this mass of complicated and detailed legislation — a principle which was not consciously present to the mind of its early advocates, and one which is still only grudgingly admitted — is the establishment and enforcement of a "national minimum" in the circumstances of employment, below which it is judged to be inexpedient, in the permanent interests of the community as a whole, that any person should be employed. "The ultimate end of factory legislation," approvingly wrote the *Times* of 12 June 1874, "is to *prescribe* conditions of existence below which population shall not decline." This compulsory national minimum is naturally a rising one. "Every society is judged, and survives," aptly said Mr. Asquith in 1901, "according to the material and moral minimum which it *prescribes* to its members."

It would be an interesting and supremely useful subject for graduate study to discover what is the national minimum which the various civilized states of the world now actually *prescribe*, by compulsory law, to the various grades and classes of citizens, in the different circumstances of their respective employments. To do this even for the United Kingdom would require much more than the space here available. The student would find that the system of regulation which began, in 1802, with the protection of the tiny class of pauper apprentices in textile mills, now includes within its scope every manual worker in every manufacturing industry. From sanitation and the duration of labor, the law has extended to the age of commencing work, protection against accidents, the fixing of meal times and holidays, the methods of remuneration, and now also, in coal mining as well as in various low-paid industries, the amount of the wages. The prescription of national minima is, however, still very far from being either uniform or systematic. The various requirements in the way of sanitation, duration of labor, hours of beginning and ending, age of commencement, meal times and holidays, remuneration and protection against accidents, often apply, each of them, to particular industries, particular processes, particular ages, particular localities and particular sexes; partly, of course, because the various detailed prescriptions are, in their very nature, applicable only to this limited extent; but, more commonly merely on account of the empirical, and so to speak, accidental character of all our legislation. Speaking generally, we may say that the policy of the national minimum has been most completely and efficiently worked out in the industry to which it was first applied, mainly cotton spinning and cotton weaving; and in which — whether *post hoc* or *propter hoc* — England still leads the world; taking industries generally, it has been far more thoroughly applied to the employment of women and children than to that of men, in respect to whom it has only lately begun; with regard to subjects of prescription, it is most universal in respect of the cleanliness, ventilation, temperature and sanitary accommodations of the work place and the means of escape from fire; next most in respect of the age of commencement, the maximum working day and protection against accidents; whilst with regard to the enforcement of a national minimum of subsistence we are, in the United Kingdom, still in the stage of gradual application to trade after trade. The policy of a national minimum secures universal lip homage, so far as it applies to children. Yet our young children may lawfully be industrially employed, or even hired out for wages, in all Ireland outside the large cities, if in any industry not coming under the Factory Acts, at any age, at all hours, without stint; in Great Britain and the Irish cities (unless new by-laws have recently been made) in any such industry at any age, for any number of hours; under such by-laws, generally only after 11 years of age, and for limted hours, differing from place to place; in agriculture not under 12 and in factories or workshops not under 13, and then only half-time unless a minimum educational standard, prescribed by the local education authority, has been attained; generally speaking, full time after 14; but in some specified industries or processes not until 16, or even 18. The prescription of a minimum wage is still illogically confined to the relatively well-paid coalminers, on the one hand, because they were strong enough to compel Parliament in 1912 to pass the Coal Mines (Minimum Wage) Act; and on the other, to certain arbitrarily selected «sweated trades» brought under the Trade Boards Act because their operatives were too weak to stand alone. Still more wanting in universality and uniformity is the enforcement of such national minima as the law does prescribe. The distribution of the task of enforcing the law among over 2,000 independent local governing bodies, in England, Scotland and Ireland; the supervision and imperfect control exercised over these by four different government departments in England, besides several others for Scotland and Ireland; and the very different views which these government departments take of their duties — to say nothing of the very different degrees to which they have consciously adapted the root-idea of factory legislation as above set forth — necessarily makes the enforcement of the law extremely uneven. Only in two branches, indeed, that which deals with «factories» properly so called, in which women and children are employed in connection with mechanical power, and in coal mining can the law be said to be at all successfully and systematically enforced from one end of the kingdom to the other. These happen to be the branches of the law which are enforced by an official staff, appointed by and solely responsible to, the Home Office in London.

For the enforcement of the policy of the national minimum, so far as this is committed to him, the Home Secretary has at his disposal, in the Factory Department of the Home Office, a «Chief Inspector,» a score of specialist and superintending inspectors, and over 160 inspectors and assistant inspectors. This staff of about 170 men, who are paid from £150 to £1,000 a year, is supplemented by 21 lady inspectors, who receive from £200 to £550 a year. All the staff are appointed after examination, without regard to politics, and are permanently employed. These inspectors are perpetually traveling over the United Kingdom, covering among them nearly a million miles annually, and keeping under inspection more than a quarter of a million distinct factories, workshops, warehouses, laundries, docks and wharves (excluding those employing adult men only, which are ignored in practice), in which nearly five millions of persons are employed. Their efforts are aided by about 2,000 «certifying surgeons,» who are paid by fees only. These are doctors in local practice who give the certificates of health without which, in certain cases, children cannot be employed. A similar, but more limited, staff is employed in the inspection of the mines and quarrie. The tradition of the Home Office in this department is that it is the business of the inspector, not merely to act on complaints, or to make so many visits, but to get the law enforced. Hence, the inspectors go hither and thither as they think fit, visiting one factory frequently, another not at all; acting on any hint or suggestion that they can get of any illegality being committed and not only not refusing to act on anonymous communications, but eagerly welcoming them when nothing better is to be had. Unfortunately, however, the paucity of the staff allowed to it by the Treasury, and the curious reluctance of English government departments to see their functions expand, has led the Home Office to forego whole fields of industrial employment in which the enforcement of a national minimum is no less necessary than those which it inspects. It deliberately omits from its regular inspection not only the work places where men only are employed (though these are also subject to the law in various particulars) — as to this, see 'Life in a Railway Factory,' by Alfred Williams (1915) — but also the myriads of «domestic workshops,» in which only members of the same family are employed, and in which the worst cases of «sweating» are found. The sanitation, too, of the workshops (not using mechanical power), even where women and children are employed, is, like the whole regulation of the homeworkers, abandoned, in the main, to the more perfunctory hands of the local authorities. On the other hand, it must be said that the Home Office far surpasses the Board of Trade in the execution of its duty of enforcing the policy of the national minimum. The scanty inspectorial staff of the Board of Trade, on whom we have to rely for the enforcement of the law relating to the conditions of employment in connection with railways and ships, confines itself practically to the investigation of cases actually brought to its notice by responsible specific complaints, or by accidents;

and takes up the attitude that it is not the business of the office, or of its parliamentary chief, to initiate anything. To the student of the factory system of the 19th century, the reflection will inevitably occur that, if the Home Office had acted on this principle, we should still have with us the «white slavery» of the Lancashire cotton mills, denounced by Oastler and Lord Ashley. The Board of Trade is more efficient in the administration of the Trade Boards Act, where the wage awards made by the joint boards of employers and employed in each trade are enforced by a small staff of inspectors who prosecute employers guilty of the offense of paying less than the prescribed minimum. But there is even a lower depth than the Board of Trade. The Local Government Board, the department to which Parliament has entrusted the enforcement of the national minimum of sanitation takes no action whatever to see that the local governing bodies put into operation the sanitary provisions of the Factory Acts with regard to workshops and the residences of home-workers; and fails even to compel negligent or recalcitrant local government bodies to put in force the Public Health Acts. It does not even make itself aware of the extent to which the national minimum of sanitation is being secured in the different localities.

Thus it is that, after a whole century of experiment in factory legislation — of experiment so demonstrably successful that it has converted the statesmen and the economists of the entire civilized world — the United Kingdom still contains districts, classes and industries in which there prevail the precise evils from which the cotton operatives of Lancashire and the coal miners of Northumberland suffered a century ago. The so-called «sweated» trades, to which factory legislation has not yet been effectively applied, remain as they were described by the select committee of the House of Lords in 1890, regions of «earnings barely sufficient to sustain existence; hours of labor such as to make the lives of the workers periods of almost ceaseless toil; sanitary conditions injurious to the health of the persons employed and dangerous to the public.» What those who believe in factory legislation demand, and what the second century of such legislation may bring to us, is the conscious application of the policy of the national minimum to every branch of industrial employment; the explicit formulation of this policy in a systematic code, applicable, with only the necessary technical variations, to every trade in every part of the Kingdom, and to every worker in such trade, of whatever age or sex; the deliberate prescription, in the interest of the whole community, of the conditions of employment, whether sanitation or hours, education or subsistence, below which no individual can be permitted to be employed; and the vigilant enforcement of this minute universal code by the joint activities of the central departments and local governing authorities, each acting, through its highly organized inspectorate, as a check, not only upon all who break the law, but also upon any who should neglect their own part of its enforcement.

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37. THE CHURCH OF ENGLAND.

It is difficult to define the characteristics of the Church of England so as to enable an outsider to understand it. In much that concerns its external form and traditions it is probably the most mediæval institution in Europe. In much that concerns its religious teaching and life it is more abreast of modern thought than any other religious body. The former characteristic may be illustrated by the fact that its property is held in some cases by direct gift of Anglo-Saxon kings, and that many of its institutions are feudal in their origin. Again it differs from any of the Protestant churches of the continent by the fact that it does not express as they do the teaching or influence of one individual reformer. In a very true sense its history has been continuous. It is an institution which has grown and developed with the history of the English people. It has been modified and changed to meet the needs of each age. It is an institution which has created a theology, not one which is the outcome of its theology. It is therefore clear that the Church of England can only be described by its history.

History.— The history of the Church of England dates from the mission of Augustine in 597 A.D. This mission was the direct action of the Church of Rome, but almost from the beginning there were other elements. A large part of England was as a matter of fact converted by missionaries from Scotland and Ireland, representatives of the old Celtic Church. Although the organization introduced by Augustine and Theodore ultimately prevailed through the whole island, yet the Church contained elements and traditions derived from Celtic sources. Gregory the Great had used language in his letters to Augustine which implied that a considerable degree of independent development was to be left to the newly founded Church, and from the first its rites and ceremonies differed from the Roman. During the Anglo-Saxon period there were two elements in its history. The kings and the people of England were full of admiration for the Church of Rome to which they owed Christianity, but, on the other hand, the Church developed more and more as a national institution and its ecclesiastical laws were the work very largely of secular councils, on which the bishops sat. The Norman Conquest brought the British Isles very much into the swim of European life, and gradually two opposing currents of policy asserted themselves strongly. On the one side a series of able ecclesiastics aimed at securing the independence and privileges of the Church and at bringing it into close obedience to the central organization at Rome. On the other side the national development tended to assert the insularity and independence of the English state and sovereigns. There was a strong opposition to foreign ecclesiastics, to payments to foreign courts and to the influence of foreign monastic orders. Legislation such as the Act of Praemunire was introduced, limiting ecclesiastical authority and in the reign of Henry V the property of alien priories was confiscated. Throughout the Middle Ages there is literary evidence of criticism on much connected with the Church, which reached its head in the work of Wycliffe who combined opposition to the monastic body and the Church of Rome with a good deal which would be called in the present day Radicalism.

Like the Church of England the history of the Reformation (q.v.) is a complicated story. The final result was produced by various influences. There was the old national feeling as opposed to the claims of the papal curia expressed in the Reformation Acts by the statement that the realm of England was and always had been an Empire; there was the influence of the Humanism of Colet, More and Erasmus, which demanded a Conservative Reformation; there was the popular objection to the rights and privileges of the clergy; there was the strong conservative element which has always been characteristic of the English people and which checked any great tendency to change; and especially during the reign of Elizabeth there was the influence of the foreign reformers. The result was a Conservative Reformation. No attempt was made to sweep away the Old Church and reconstruct it, either doctrinally or as regards the constitution *de novo*. Such changes were made as were found necessary to express the different influences which prevailed. This might be shown in various ways and will appear as we proceed with our account. For example by a statute law which has never been repealed, the whole of the canon law which had been accepted in England before the Reformation is still the law of the Church, except in so far as it is contrary to Act of Parliament. By the time of Queen Elizabeth's reign the various parties had become clear. It was clearly the aim of the rulers of the time to unite as many elements as possible in one national church and the ultimate reform settlement was based therefore on a policy of modeling a national church which should include very varied elements. The result of the Reformation was to modify and reform the existing institutions, not to create a new church in accordance with any system of doctrine. See GREAT BRITAIN — THE REFORMATION.

Since that time the Church of England has suffered hardly any change in its formularies or in its constitution; but it has been profoundly changed by the influence of various schools of thought, each of which has interpreted its formularies in accordance with their convictions. The close of the reign of Queen Elizabeth, the writings of Hooker, mark the beginning of a typical theology, and Anglicanism in the modern sense of the term was developed and worked out by the great divines of the 17th century. The result of the Commonwealth and of the Puritan domination was to strengthen the hold of the English Church on the nation, and at the time of the Restoration a vast majority of the people were attached to it. A very little more statesmanship on the part of the restored Cavaliers might have almost wiped out Puritan traditions. At the time of the Restoration the High Church party were the dominant factors in the Church, but the Roman tendencies of Charles II, the Roman Catholic position of James II, the fear of papal influence, and the Non-Jurors schism on the accession of William weakened its influence. Some of the ablest members of the High Church party left the Church at the time of the Non-Jurors' secession. High Churchmen were under suspicion as being opposed to the reigning dynasty, and in the first half of the 18th century the prevailing influence was the latitudinarian movement associated largely with the name of Tillotson. The Whig ascendency, the suppression of convocations and the influence of the deistic literature reduced the spiritual life of the country to the lowest ebb. The movement for religious awakening grew up in the Church of England, but a secularized church was unable to contain the vigorous spiritual life of Wesleyanism. But though the Wesleyan Society passed outside the Church, its influence lived within it, and at the close of the 18th and the beginning of the 19th century, the evangelical movement was strong. All through this period the High Church party had lived on. The failure of the Stuart succession destroyed all suspicion of disloyalty, and eventually latitudinarianism and evangelicalism lost their hold on the country. High Church influences began to assert themselves again. The religious movement was assisted by a romantic reaction against the commonplace 18th century traditions and by the revival of an idealistic philosophy, and it came to a head in the well-known Oxford Movement, which is usually supposed to date from the year 1833. The Oxford Movement in its double aspect of High Church principles and of ritualism has profoundly changed the religious life of the whole Anglo-Saxon world. It was followed rapidly by a broad church reaction, and there has been a tendency of recent years for a new party to arise, combining many of the elements of both the schools. At the present time the theology of the Church of England is influenced by all the different movements we have described. The Church of England is not

«Anglicanism,» but it has created Anglicanism within the fold of an Establishment. Various different types of thought prevail and the position can only be understood by looking at the Church as the result of the history we have described.

General Principles.— The Church claims to be that portion of the Universal Church of Christ located in England, a «true and apostolical church teaching the doctrine of the Apostles.» It acknowledges that to the Crown «the chief government of all estates of this realm, whether they be ecclesiastical or civil, in all cases doth appertain.» It is established, i.e., it is part of the constitution of the country. It is National; Protestant in so far as denying that the Bishop of Rome has jurisdiction in England and condemning the errors of the Roman Church; Catholic as claiming to be a portion of the Universal Church of Christ. It grounds itself on Scripture and the three creeds. Its ministers are bishops, priests and deacons. It claims to be continuous with the primitive church.

Constitution and Law.— The constitution of the Church was influenced by two main characteristics. One was a desire to do away with what we believe to be mediæval corruptions; the other to preserve the primitive organization of the Church. Naturally also there was a tendency to preserve all the distinctly national institutions which were inherited from the past. The orders of the Church of England are bishops, priests and deacons, and it is definitely laid down that the possession of episcopal ordination is necessary for holding office in the Church. The clergy of the Church meet in their own assemblies in Convocation which were originally the meetings of the clergy for taxing themselves at the time when they were immune from general taxation. At the present day, convocations have no legislative power except such as is intrusted to them on any special occasion by Parliament, and no change can be made in any law or custom of the Church without the consent of Parliament. But it was the theory, not perhaps always acted upon, of the Reformation and it has been the custom since, that Parliament should not legislate for the Church except with the advice of the clergy. Practically the result of this has been that external changes in either form or constitution of the Church have hardly been made since the Act of Uniformity of the year 1662. By the common law of the country the parson or parish priest has a freehold in his cure, and he can only be removed by very complicated legal processes. The result of this has been to make the English clergy very independent of any authority. The influence of the bishops as men may be very powerful and effective but if they wish to support their opinions or the administration of the law by any appeal to authority they are hampered at every turn by a complicated legal system which makes it exceedingly difficult for them, even in spite of recent changes, to interfere with acrimonious or refractory clerks. The difficulties have been increased by the unsatisfactory character of the Church Courts. It is a fundamental principle of the English law that the Sovereign is in all causes, as well ecclesiastical as civil, supreme. The Church has its own courts and those courts are very largely secular in character and do not command the adherence of the clergy, while the Judicial Committee of Privy Council which is the final court of appeal in matters ecclesiastical, has not confined itself to reviewing judgments of courts on the point of view of justice to the individual, but has attempted to legislate by its judgments, and has not met with anything like universal acceptance. The position then is that the constitution of the Church and the Church Courts has grown up not in obedience to any particular theory, but by modifications from time to time of the traditional system and that it does not at present satisfy the convictions of a large section of the Church.

Establishment.—The position of the Church of England is that it is established by law and it is part of the constitution of the country. What exactly this implies has never been clearly defined and there are different sections of opinion on the subject in the country. The High Church party claim that the position of the Church is continuous with that before the Reformation and that the Church is by constitutional right free to determine its own teaching. A party which would be called by their opponents Erastian would claim that the Church was entirely subject to the Sovereign and to the Houses of Parliament. The former would point out that the Sovereign is rightly supreme in all actions relating to liberty of person and property, that (as shown by many Acts of Parliament, notably the Scottish Church Act of 1905), when questions of property are involved the Civil Courts or Parliament have to deal with the internal matters of the different religious bodies whether they call themselves «Free» or not, and that what the state has done is to accept to a large extent the Church Courts as part of its constitution. The Church of Ireland (Protestant Episcopal) was disestablished in 1869. An Act of Parliament was passed in 1914 disestablishing the Church of Wales and Monmouthshire, but the operation of the Act was postponed until after the termination of the war.

The Property of the Church.— The property of the Church consists of the following: (1) Tithes, which are charges upon the land paid originally to the parochial clergy. The origin of the institution of the tithes is much debated. It appears to have begun as a voluntary custom from charges made upon the land by the owners, and these customs and charges have gradually been recognized by law and become universal. Up to the time of the Tithe Commutation Act in 1836 all these payments were made in kind: by that Act they were commuted into money payments. (2) Landed Property. The Church has inherited a portion of the large estates which were in the possession of the bishops and other ecclesiastical bodies during the Middle Ages. These were ultimately derived in many cases from a grant by the sovereign or of individual land-owners. They include in addition to landed property, manorial rights and in the County Palatine of Durham royalty rights. In many cases they date from a period before the Conquest; for instance, Farnham Castle has been the property of the Bishops of Winchester from the time of a grant made in Anglo-Saxon times. In the great majority of cases now the landed property apart from the Glebe lands of the parochial clergy is managed by the Ecclesiastical Commissioners and the bishops receive fixed stipends. (3) Modern Endowments. These largely consist of money, and are for the most part administered by the Ecclesiastical Commissioners.

Prayer Book.— The character of the Church of England is shown very clearly in the Book of Common Prayer. The Prefaces lay down that the object throughout was to preserve the old form of services but to fit them to the altered needs of the time, and in many cases to return to what were looked upon as more primitive customs. The first edition of the Prayer Book was issued in 1549, the second in 1552, the third in 1559, the fourth in 1604, and the fifth edition in 1662. The services throughout preserve the structure of the pre-Reformation books, but they are shortened and simplified; some of the finest of the collects were the work of Archbishop Cranmer himself.

Doctrinal Formula.— The doctrinal formula of the Church of England is the Thirty-nine Articles of 1571, and the belief of the Church is also to be gathered in the Homilies and Prayer Book. The production of religious formulæ was the leading feature of all sections of the Christian Church during the Reformation period and amongst all the varied formulæ the Articles of the Church of England are conspicuous for their shortness. At one time the subscription to these Articles was imposed by the State not only on all the clergy but all sections of the laity as the means of qualifying for office, but the tests for the laity have now been entirely done away with and that of the clergy is limited to a general assent to the teaching of the Articles. The courts have always been very broad in their interpretation of the doctrine of the Church of England. The clergy undertake to use the Prayer Book and no other document in public worship except in so far as allowed by lawful authority and give a general assent to the teaching of the Thirty-nine Articles. Within these limits the fullest freedom of opinion and expression of opinion is allowed.

Anglican Theology.— The theology of the Church of England has had certain special characteristics. (1) Owing to its connection with the universities there has always been a markedly learned character about a section of its clergy. *Clerus Anglicanus stupor mundi* was the verdict of the 17th century, and during that period a number of very learned works were produced by the Church. It suffered like all departments of the country by the intellectual lethargy of the universities in the 18th century. In the 19th century its character to a large extent revived. (2) But though a learned Church there have always been certain characteristics to distinguish it from other religious bodies. Its interest has been very largely in historical and exegetical studies. It has sedulously eschewed systematic theology. There is not at the present day an authoritative work stating the beliefs of the Church of England. It has been largely concerned with questions of ecclesiastical organization and the special features which have distinguished it from the Roman Catholic and Protestant churches. (3) The most prominent product of its activity has been the creation of that school of theology which might be defined as Anglican. Whereas Luther and Calvin created Lutheranism and Calvinism the traditions of Anglicanism, on the contrary, are the product of the position of the Church of England rather than the creator of it. Although certain broad principles underlie the Reformation it would be impossible to say that any one prominent principle prevailed, but the result of a Conservative Reformation, with some reference to primitive truth, was to create a body which preserved historical tradition in the threefold order of bishops, priests and deacons, and the customs and rites of the primitive Church and at the same time had largely abolished mediæval corruption. The defence of this position created Anglicanism. A knowledge of the Eastern Church provided the exponents of that system with a very strong weapon and the Oxford Movement (q.v.) finally made this the dominant note in Anglican theology. But it must not be thought that it is necessary to hold «Anglican» views to be a member of the Church of England. Within the limits of the Church are many who would strongly object to those views. (4) The opportunities for a liberal position created on the one side by the relations of the Church with the universities and on the other side by the freedom of opinion secured by secular courts created a strong Broad Church movement. As the modern exposition of Anglicanism dates from the 'Tracts of the Times' so the modern exposition of the Broad Church theology dates from 'Essays and Reviews.' The aim of the Broad churchman has always been to keep himself in touch with modern science and modern criticism. But of recent years there has been a considerable rapproachment between these two schools and the appearance of 'Lux Mundi' marked a new departure by which the Anglican school accepted many of the results of modern criticism and thought which their predecessors had condemned. (5) Ever since the Wesleyan movement and the Evangelican movement which was its accompaniment in the Church of England, there has been a strong Evangelical party within the Church. Its tenets were represented by Simeon and the Cambridge school of the early 19th century and it took for many years a lead in philanthropic work and was especially connected with the abolition of the slave trade. But it has always failed as compared with the other two schools in an intellectual exposition of its system and has never in any great degree influenced the theology of the Church. Outside all these definite schools it is probable that there is a considerable element in the Church consisting of those who are by tradition loyal members of the Church of England, who accept its formularies without attempting to interpret them very definitely, whose interest in religion is practical rather than theoretical, and who are prepared to accept and work from the point of view of common sense rather than of elaborate theological accuracy the system in which they find themselves.

Doctrinal Teaching.—(1) The English Church has never accepted the position that the Bible and the Bible only is the authority for its belief. Its definite statement is that whatever is not contained therein or may be proved thereby is not necessary to salvation. But it has always recognized that in interpreting the Bible the traditions of the Church may be used. As regards the canon of Scripture it occupies a middle position between the Protestant and Roman Catholic churches. It accepts the Apocrypha, though not as a standard of belief, or as authority for faith. (2) The acceptance of the two Creeds: The Nicene and the Apostles. This defintely means that its standard of belief is the traditional, orthodox teaching of the Church. It is, howover, slow to express a decision, or impose its belief. (3) The acceptance of the two sacraments, of Baptism and the Lord's Supper, as generally necessary to salvation. As regards sacramental teaching it has always been very wide in its limits. It makes its standard the acceptance of the authorized service and it has frankly admitted that while Zwinglianism and the doctrine of transubstantiation are incompatible with its formularies, within these limits any form of eucharistic doctrine is allowed. As regards other rites and ceremonies it has always made a very definite distinction between the two sacraments and others, although its formulas have occasionally used the term sacrament in a wider signification. But it lays great stress on confirmation, orders and matrimony, and allows private absolution and confession, although it does not make them compulsory. (4) The acceptance of the threefold ministry of bishops, priests and deacons. Here again its demands point to a system rather than to a doctrine. All its clergy must be episcopally ordained, but it does not demand any definite theory of ordination apart from what is implied in acceptance of the ordinal. A section of the Church would make the acceptance of the doctrine of apostolic succession necessary, but it has never been the teaching of the Church officially and as a whole.

Negatively the Church condemns emphatically the system and authority of the Roman Catholic Church and the infallibility and supremacy of the Pope. It definitely condemns also certain doctrines of purgatory, the invocation of saints, the sacrifice of the mass, relics, the merits of the saints, and works of supererogation. In relation to the Eastern Church, while differing fundamentally in tone and temper, it is very nearly in doctrinal harmony, the chief points of distinction being of course the invocation of saints, the doctrine of the double procession, the use of the term transubstantiation, while there is some general hesitation about the acceptance of all the seven councils or the necessary acceptance of the seven sacraments. As against the Protestant churches as a whole, it would always avoid accepting the extreme forms of predestination or justification by faith; it would lay stress on the need of interpreting the Scriptures in accordance with the traditions of the Church; its would almost universally lay greater stress on the reality of the sacramental system, and it would maintain episcopacy as an institution against every other form of Church government whilst condemning the tendency to disunion which characterizes so many of the Protestant bodies. To some its mediating attitude appears to be a mere political compromise between two incompatible ideals, to its own members it would seem to be the one Church which most clearly holds the balance between the various conflicting aspects of Christianity.

The Church and the Nation.— The relation of the Church of England to the English nation has been modified very considerably in the early part of the last century by a series of enactments. Almost all its exclusive privileges have been gradually taken away. It has no longer a paramount position in the universities, and membership of the Church of England is no longer necessary for any civil position in the state. Side by side with this there has been an enormous increase in the population, which has made the existing ecclesiastical arrangements quite unfit to cope with the immense mass of new work. Many of the dioceses are excessively large and the process of sub-division has not been rapid enough to keep up with the demands. In many districts the clergy and the Church have been quite inadequate to meet the spiritual demands of the people. This fact, combined with the increase in just those sections of the populace which were least touched by the influence of the Church of England, has led to a very great increase in Nonconformity. But this loss of privilege and greater need of work have not been detrimental on the whole to the Church. The various spiritual movements that we have narrated and the demands of the day have stirred up an immense amount of voluntary work on the part of the Church. The old rigid high and dry schools have had to make way for younger men with very varied forms of activity. Methods of religious propaganda have been borrowed, alike from Nonconformist and Roman Catholic sources. The Church has taken a vigorous interest in educational and social topics. Missionary enterprises, always strongly supported by the Low Church party, have been exceedingly vigorous. The exigencies of a Colonial Empire, the spread of commercial activity, have created new demands and the last hundred years have marked an immense increase in the religious activity and the enterprise of the Church. Including the Anglican Church in America the number of bishops now connected with the Church exceeds 300, and every 10 years the Conference at Lambeth marks the extent and growth of the Anglican Church.

As regards its hold upon the people there are no trustworthy statistics, but on the upper and upper-middle classes its hold is very strong. Amongst the working classes the greater majority are nominally adherents of the Church of England, but a great deal of the religious life is Nonconformist. As against Nonconformity the Church of England is little organized for political activity, and its hold upon the people and its influence are very intangible and indeterminable quantities. Probably, except perhaps in some of the great centres of the populace, its influence is very much greater than is often imagined.

Statistics.—Accordng to the census of 1911 there were 14,614 ecclesiastical parishes, presided over by an incumbent or minister. In 1915 there were about 14,000 incumbents; 15,958 churches with sitting accommodation for 7,316,605; 2,500,000 communicants, and over 3,000,000 children attending Sunday schools. The voluntary offerings to the Church in 1913–14 amounted to over $41,000,000.

Bibliography.— *History.*—The best continuous history of the Church of England is probably 'A History of the English Church' in eight volumes by various writers, edited by the late Very Rev. W. R. W. Stephens and the

Rev. William Hunt. Shorter histories are those by Wakeman, Spencer, Boyd-Carpenter, etc.

Canon Law.— 'Reports of the Royal Commission on Ecclesiastical Courts,' published in 1881–83, and Manuals of Church Law, such as Phillimore's 'Ecclesiastical Law.'

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Principal of King's College, London, 1908–12; author of 'The Miracles of the New Testament' (1914).

38. ENGLISH NONCONFORMITY. Early History — Death of Queen Elizabeth. — Nonconformity as a definite ecclesiastical movement in English history may be said to have had its origin in Elizabeth's reign. But regarded as a spiritual force appearing now and again and here and there in the nation, it may be traced back to a much earlier time. All who protested against the prevailing ecclesiastical assumptions of the clergy, and who dared to think and act for themselves in matters spiritual, may be regarded as Nonconformists, and were called to suffer for their faith. From 1401, when the statute for burning heretics came into force, to 1534, the date of the renunciation of Papal supremacy, no fewer than 111 persons were burnt at the stake; and from 1534 to 1558, the year Queen Mary died, 337 more were added to the roll of the protestant martyrs. On the accession of Queen Elizabeth it was hoped that a better day had dawned for those men of Puritan sort who desired to see the Reformation carried still further. But, while breaking with the Papacy as completely as did her father before her, the queen was not prepared to yield to what she regarded as their extreme views in the matter of religious ceremonial. She cared for order, pomp and appearance in the worship of the Church as in other things, and her princely power combined with her indomitable will made her supreme in ecclesiastical affairs. Several of the bishops and divines in the early years of her reign had been in close friendship with the continental Reformers and were prepared to go far in the Puritan direction. But the queen would not hear of it. Bishop Jewell writing to his friend Bullinger at Zurich in 1566 said: "I wish that all, even the slightest vestiges of Popery might be removed from our Church, and above all from our minds. But the queen at this time is unable to endure the least alteration in matters of religion." Thus began that conflict between the individual conscience and the power of the state church which has continued down to our own time.

The rupture between Elizabeth and the Puritan party first took open shape on the promulgation of the orders known as "Advertisements," which, in 1566, specified the minimum of ceremonial the State was prepared to tolerate in the services of the Church. Uniformity was to begin to be enforced at a given date, and deprivation of benefice was to follow in the case of the clergy after three months' refusal of compliance.

The two sides thus having joined issue the Puritan party became divided, taking different directions. Many of the ministers conformed, using only such ceremonial as they were compelled, submitting to many things they did not approve in the hope of a better time when a simpler and, as they believed, a more scriptural system, might come to prevail. Others, again, while remaining in the Church, sought to bring about a radical change in the direction of Presbyterianism, the discipline of which was elaborately organized both in London and the Midlands, and a literature created which assailed with more and more of vehemence the existing establishment. In 1571 Thomas Cartwright, Lady Margaret Professor of Divinity at Cambridge, issued two addresses to Parliament under the title of "A First" and "A Second Admonition," which were elaborate attacks upon the Episcopal system and vigorous assertions of the divine right of the Genevan discipline. Having exercised this discipline privately for a time they proceeded to bolder measures, setting up their system openly in the parish churches of Northamptonshire and Warwickshire. Eventually, however, this movement was stamped out by the greater power of the State, and Nonconformity was henceforth to be sought for in other directions. Some of the Puritans became actual Separatists from the episcopal system. Their starting-point in church polity was the existence of spiritual life, the personal relation of the individual soul to God; and a church in their view was a community of spiritual men: "The kingdom of God," said they, "is not to be begun by whole parishes, but rather of the worthiest, were they never so fewe." Taking as their fundamental position that the Church visible consists of a company and fellowship of faithful and holy people gathered in the name of Christ, they went on to maintain that a Church so composed is competent for self-government This self-governing power they further regarded not so much as a privilege to be enjoyed as a sacred trust to be discharged. The period when these men, who came to be known as Congregationalists or Independents, actively promulgated their views may be roughly stated as between 1570 and 1593. Their leaders during the first half of this period were Richard Fitz, the pastor of a London church, and Robert Browne and Robert Harrison who formed a Congregational church in Norwich in 1580; and the most active promoters of their principles in the second half of this period were Henry Barrowe and John Greenwood, who, together with John Penry, the Welsh martyr, suffered death for their opinions in 1593.

The penal laws against Nonconformity, severe before, were made still more severe bv the Conventicle Act of 1593, which provided that all persons above 16 years of age being present at unlawful conventicles, should, on conviction, be committed to prison, there to remain without bail or mainprise until they made open submission and declaration of conformity at some church or chapel, or usual place of common prayer. The offender who refused to make such public submission within three months of conviction should be compelled "to abjure this realm of England, and all other the Queen's Majesty's dominions forever.» This sternly repressive Act explains why during the 10 years previous to the accession of James I so many Nonconformists languished in prison, while many were banished and many more went into voluntary exile.

From the Accession of James I to the Revolution of 1688.— With the death of Elizabeth and the accession of James I the hopes of the Puritan party once more revived. For the king had been brought up among Presbyterians, had been the pupil of George Buchanan, and a frequent hearer of the disciples of John Knox; and had even invited Thomas Cartwright, the leader of the English Presbyterians, to a professorship in Scotland. Regarding him, therefore, as at least not unfavorable to Puritan ideas, they met him on his way to London in 1603 and presented the Millenary Petition, so called, as representing the views of a thousand of the clergy. But again their hopes were destined to disappointment. At the Hampton Court Conference, held the following January, the king spoke contemptuously of Presbyterianism and declared he would either make these church reformers conform themselves or he would harry them out of the land. The Conference was followed by the Canons of Convocation which were so constructed as to make it impossible for any man who disagreed with the constitution and articles of the Church, as set forth in them, to remain honestly among its clergy. The immediate result was that some 300 ministers were ejected from their livings. The Nonconformists who had fled to Holland in search of liberty of worship after the Conventicle Act of 1593 were reinforced from time to time by the arrival of others of like mind. Especially memorable among these were the members of the little church at Scrooby in Nottinghamshire, who, under the leadership of William Brewster and John Robinson, fled to Amsterdam in 1608, and subsequently settled in Leyden. This was the church from which, in 1620, the Pilgrim Fathers of New England crossed the Atlantic as the founders of Plymouth Colony, the starting-point of the United States.

The Separatists who remained in England were subjected to perpetual hardships and persecution on account of their faith. James I was succeeded by Charles I, the new king coming completely under the influence of Archbishop Laud, who proceeded to great lengths in enforcing conformity to Prayer Book, articles and canons. While the two opposing forces of Catholic tradition and Puritan earnestness were thus contending within the arena of church life, the two opposing forces of absolutism and the desire for popular government were at the same time at war within the political sphere. The men who contended for the divine right of bishops maintained also the theory of absolute monarchy and the divine right of kings. The leaders of the Church made the serious mistake of allying its interests with the side hostile to the constitutional liberties of the nation. With a high-spirited people such a course could only have one issue — that of disaster and overthrow. The attempt to base the Church on the subversion of freedom ended in civil war and the temporary overthrow of the very institutions the advocates of absolute government sought to maintain.

After Charles and Laud came the Long Parliament and Cromwell. Two main ideas seem to have guided Cromwell's ecclesiastical policy — first, that there should be an established non-episcopal Church, on a broad basis of evangelical comprehension, to be endowed and controlled by the State; and next, that outside that Church there should be an ample toleration of Dissent, which therefore provided for the existence of separate congregations. The Church, as established, recognized no one form of ecclesiastical organization; it had no church courts, no church laws or ordinances. Nothing was said about rites and ceremonies, nothing even about sacraments. These were left as open questions to be determined by each congregation for itself. All that the commissioners for each county dealt with was the personal piety and intellectual fitness of the minister presented by the patron to the living; and the church buildings were regarded as the property of the several parishes.

This loosely organized system came to an end with the ending of Cromwell's life. When the strong hand which alone was able to control the conflicting forces let loose in a time of civil war, fell powerless, the nation, weary of strife, restored the monarchy and with the restoration of the monarchy there came back also the episcopal system of government in the Church. In 1662 the Act of Uniformity cast out 2,000 of the ministers as being unable to give unfeigned assent and consent to all and everything contained and prescribed in the Book of Common Prayer. From that hour Nonconformity took definite and permanent shape in English national life. It defied all attempts to crush it out of existence. The Conventicle Acts of 1664 and 1670 sent thousands of godly people to prison where many of them died in the pestilential jails of the time. Others were ruined by heavy fines and the spoiling of their goods, but the more Nonconformity was oppressed the more it grew, and at length by the Declaration of Indulgence of 1672 the government was compelled to admit that no fruit had been gained by these forceful courses. Still after brief respite these forceful courses were resorted to again. Conventicles were again frequented; spies and informers renewed their dishonored calling and persecution went on its cruel and iniquitous way so long as the Stuart kings remained on the English throne. Happily sooner or later tyranny digs its own grave, and when William of Orange landed at Torbay, 5 Nov. 1688, the hour of deliverance had struck. The persecuted Nonconformists felt that the tidings were almost too good to be true. Year by year for a long period they observed the anniversary of their emancipation, exclaiming ever and again: «When the Lord turned again the captivity of Zion we were like them that dream. The Lord hath done great things for us whereof we are glad!»

From 1688 to the Present Time.— The Revolution of 1688 was followed by the Toleration Act of 1689 which repealed the Penal Acts and permitted Nonconformists to erect their own places of worship which were registered, and so placed under the protection of the State. To the providing of local habitation for their communities and their principles they addressed themselves with considerable energy. In the quarter of a century which elapsed between the accession of William III and the death of Queen Anne, besides many temporary structures, some 1,500 permanent places of worship were opened and maintained. The political history of Nonconformity in the 18th century is largely concerned with the endeavor to set aside certain disabilities to which its adherents were still subjected, the Toleration Act notwithstanding. The Corporation Act of 1661 provided that no person could be elected as mayor, alderman, recorder, bailiff, town clerk, or common-councilman who had not previously taken the sacrament according to the rites of the Church of England. The Test Act of 1673, though aimed mainly at the Roman Catholics, by widening the scope of the Corporation Act told heavily also against Protestant Nonconformists. It forbade any person holding office under the Crown, of any nature whatsoever, who could not produce a certificate to show that he had taken the sacrament at the parish church. Whoever offended against this law was thenceforth disabled from suing in a court of law, acting as guardian or executor, taking any legacy or deed of gift, or bearing any public office, and was further liable to a penalty of $2,500.

These acts were unaffected by the Act of Toleration and were naturally felt by the Nonconformists to be a serious grievance. The Occasional Conformity Act of 1711 intensified this grievance. It provided that any person holding any civil or military office who should be found in a conventicle, or in any religious meeting of more than 10 persons, other than one conducted according to the rites of the Established Church, should forfeit the sum of £40, and be disabled for the future from holding any public office.

In 1717 an agitation was commenced for the repeal of these three tyrannical and disabling acts. A bill for the purpose was introduced into the House of Lords by Earl Stanhope, and on a second reading was carried by a division of 86 votes against 68; but on going into committee the clauses relating to the Test and Corporation Acts were withdrawn from the bill and it passed without them. Thus it came about that while the Occasional Conformity Act was repealed at that time it was not till 1828 that a bill for the Repeal of the Test and Corporation Acts received the royal assent.

Still in the interval between 1717 and 1828 several distinct steps were taken in the direction of liberty. In 1742 a dissenter was elected to the office of sheriff of the city of London, and on his refusal to qualify by taking the sacrament he was cited to the Court of King's Bench which decided against his claim to exemption. The Corporation then passed a by-law imposing a fine of $2,000 upon every person who declined to stand for the office after being nominated and a fine of $3,000 upon every person who, being elected, refused to serve. Again and again dissenters were nominated, and as they all refused to serve, fines were levied amounting in six years to more than $75,000, which went toward the erection of the new Mansion House. In 1754 it was resolved to make a stand against this oppressive procedure. After a lawsuit which was traversed from court to court, and which lasted for 13 years, Lord Mansfield, by his memorable and scathing judgment of 1767, put an end to the iniquity forever.

This gain in the direction of freedom was followed by another in 1779 when Protestant Dissenting ministers and schoolmasters were no longer required to sign the Thirty-nine Articles. In 1812 the Quakers' Oaths, the Conventicle and Five-Mile Acts, which till then had remained on the statute book, were repealed and the Free Churches were placed in respect to legal protection from disturbance during times of public worship, on an equality with the Established Church.

The repeal of the Test and Corporation Acts in 1828 was followed by the great Reform Bill of 1832 which did much to introduce the rule of the middle class in English society. The result was a large accession to the strength of Nonconformity, both political and social. Their influence entered more fully into the stream of the national life. They were found taking active part in Parliament and in municipal councils; the national universities were thrown open to them in 1871, and as the result of a recent religious census it was found that quite half of the worshipping population of the country were in attendance on the Nonconformist churches of various denominations. It may be well to add to this historical sketch of the older Nonconformity a brief reference to the later born but powerful religious society known as Wesleyan Methodism, which taking its rise in the 18th century, has gone on developing and consolidating ever since. Its internal history is largely that of a struggle for greater freedom and an increased representation of the laity in the government of the Church. Neither Wesley himself nor the other early leaders in Methodism believed in democratic government in ecclesiastical affairs, and continued resistance on their part to the extension of the lay element in the Conference led to one secession after another, these separating bodies forming sister communities. Still while working with more breadth and democratic freedom they remained loyal to the doctrines held by the great founder of Methodism and to the ecclesiastical system he had elaborated. These various off-shoots are known as the Methodist New Connexion, the Primitive Methodists, the Bible Christians, the Wesleyan Reform Union, the United Methodist Free Church and the Independent Methodist Church. Notwithstanding these successive secessions and some occasional disasters the original Wesleyan Society has shown marvellous vitality, elasticity and resource. While in 1816 in Great Britain and Ireland there was a membership of 241,319, according to the latest minutes of Conference that membership has risen to 600,750. If we add to this the number of members belonging to the various branches of Methodist outside the main body, to the Foreign Missions, to the French Conference and to the South African Conference we reach a total of nearly 2,000,000. For the due care of this large body they have an ordained ministry of 4,329, besides 40,308 lay preachers.

Passing from Wesleyan Methodism to the Free Churches generally it may be mentioned that these various bodies of Christians outside the Established Church have in recent years entered into a sort of federation without sacrificing their separate self-government. This federation is known as the National Council of the Evangelical Free Churches and consists of representatives of the local Councils of the Congregational and Baptist churches, the Methodist churches, the Presbyterian Church of England, the Free Episcopal churches (including the Moravians), the Society of Friends, and such other evangelical churches as the National Council may at any time admit. In 1915 there were in England and Wales (communicants): Baptist, 390,183 and 540,145 Sunday school children; Congregationalist, 454,748, and 634,585 children; Presbyterians, 87,667, and 90,521 children; Quakers, 2,836, and 21,407 children; Church of Christ, 12,535, and 15,893 children; Moravians, 3,427, and 5,144 children; and other smaller bodies making up a total of 2,136,782 Nonconformist communicants and 3,219,633 Sunday school children; sitting accommodation for over 8,000,000; 9,364 ministers and 50,787 lay preachers.

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From 1688 up to the Present Time.— Stanhope's 'Reign of Queen Anne'; Burnett's 'History of his Own Time'; Calamy's 'Own Life'; 'History of the Dissenting Deputies' (1813–14); Halley's 'Puritanism in Lancashire'; Wilson's 'History of the Dissenting Churches'; Bogue and Bennett's 'History of the Dissenters'; Crosby's 'History of the Baptists'; Taylor, J. J., 'A Retrospect of the Religious Life in England'; Skeats's 'History of the Free Churches' (2d ed.); Stevens's 'History of Methodism;' Turner, F. Storr, 'The Quakers'; Bost's 'History of the Bohemian and Moravian Brethren'; University Tests Abolition Act, 34 and 35 Vict. c. 26:16, June 1871.

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39. ENGLISH ROMAN CATHOLICS.

History.— The Roman Catholic Church in England is descended from those who in the reign of Elizabeth refused to accept the Reformation (q.v.) and remained in communion with the See of Rome. Nearly all the English bishops were included in this number and were deprived of their sees and stringent laws were made with a view to enforcing conformity with the established religion. Notwithstanding these, however, and the fact that they were frequently put into execution, the number of those who adhered to the Roman Catholic faith was, for a time, very considerable. No form of ecclesiastical government was instituted at first, as hopes were entertained of a national reunion with Rome; but in the meantime, in order to perpetuate a succession of clergy, several colleges were established on the Continent, in which also the laity obtained their education. Chief among these was the college at Douay, in Flanders, founded by Cardinal Allen in 1568. Others were in Rome, Paris, Saint Omer, Seville, Valladolid, Lisbon, etc., several owing their origin to the well-known Jesuit, Father Parsons. Most of these still exist, some on their original sites, while others, having come to an end during the French Revolution were refounded in England, for the laws against Catholic schools had then been relaxed. It was undoubtedly due to the English colleges abroad that the Roman Catholics in England were saved from extinction.

Early in the 17th century, when the hopes of reunion had become remote, an attempt was made to form a proper ecclesiastical government for the Roman Catholics; but it was not until the reign of James II that affairs were put on a permanent footing. England was then divided into four "districts"— the Northern, Western, Midland and London — each under the government of a bishop called a "Vicar Apostolic." This means the he was, by a kind of legal fiction, bishop of an Asiatic see "*in partibus Infidelium*," and he ruled his actual "district". with authority delegated directly by the Pope. Thus the first "Vicar Apostolic" was nominally Bishop of Chalcedon. A similar arrangement was made a little later in Scotland. And all the colonies having no ecclesiastical government of their own, were considered as belonging to the "London District," so that in early days, the Roman Catholics of North America were under the London "Vicar Apostolic." The beginnings of the present American Roman Catholic hierarchy date from the time of the War of Independence. In England the government by "Vicars Apostolic" continued until the establishment of the hierarchy in 1850; in Scotland it lasted until 1878.

After the brief reign of James II new penal laws were enacted against Catholics and the time which followed may be considered the low water mark of Roman Catholicism in England. The hopes they had placed in the Stuarts had failed and the outlook seemed dark and dreary. There were numerous defections about that time and hardly any converts were made to replace them. The only centres where the Catholic religion could be regularly practised were the country seats of the old Catholic families and in London the chapels of the various Roman Catholic ambassadors.

Toward the end of the 18th century, however, there were signs of better times for them. The penal laws were mitigated by Parliament in 1778 and practically abolished by a second Act in 1791, after which Catholic chapels began to spring up in many of the larger towns and a certain number of conversions were made. Roman Catholics were still, however, disqualified from sitting in either house of Parliament, and were under many other civil disabilities. These were not formally removed until the Act of "Catholic Emancipation," obtained by the agitation of O'Connell and the Irish in 1829.

Three events of later time must be briefly alluded to, as having had a permanent effect on the state of English Catholics. One was the French Revolution, which had a double effect. In the first place, it drove back to England the numerous communities of English monks and nuns, who had settled abroad during penal times, and by accustoming the people in England to their presence amongst them, prepared the way for the rapid multiplication of such institutions in later times. In the second place, it caused some thousands of French priests to take refuge in England, where they were received with marked hospitality, and considerable sums both of private and public money were apportioned to their relief. Most of them indeed returned to France on the signature of the concordat between Napoleon and the Pope in 1801; but a certain number remained in England and founded missions or other Catholic works, some of which still continue. The second event to be alluded to was the great immigration of the Irish after the potato famine in 1845–49, which was the chief cause of the rapid increase of the Catholic congregations at that time and later. The third was the Oxford Movement (q.v.), which though it did not have such a great effect numerically speaking, nevertheless brought over men of standing and influence who have left a lasting mark on the Church. The names of Newman, Manning, Faber, Ward, Oakeley are only some of many that might be mentioned in this connection.

Present Ecclesiastical Organization.—At the present day the Roman Catholic Church in Great Britain is ruled by 26 archbishops and bishops, who are divided thus: England and Wales, three archbishops, of whom one is a cardinal, 13 suffragans and three auxiliary bishops; Scotland, two archbishops, one archbishop coadjutor and four suffragan bishops; Ireland, four archbishops (one a cardinal), 23 bishops and one bishop auxiliary. The titles of the English sees were expressly chosen to be different from those of the Established Church, though the latter have since adopted three of the Roman Catholic titles — Liverpool, Birmingham and Southwark. Each diocese has a chapter, though there are no resident canons; they are chosen from among the senior clergy of the diocese and meet at stated intervals. There have been four archbishops of Westminster — Cardinal Wiseman (1850–65); Cardinal Manning (1865–92); Cardinal Vaughan (1892–1903); and Cardinal Bourne since 1903. The new cathedral at Westminster was begun under the direction of Cardinal Vaughan in 1895. It is in the early Christian Byzantine style, the architect being the late Mr. J. F. Bentley, who died during its construction in 1902. The number of priests in England and Wales in 1915 was 3,985, with 1,879 churches, chapels and establishments; Scotland, 583 priests and 428 churches, chapels, etc.; the number of priests in Ireland was given as 3,750. Roman Catholics in England and Wales are estimated at 1,900,000; Scotland, about 545,000, and Ireland, according to the 1911 census, 3,242,670.

Since the abrogation of the penal laws more than a century ago, mission churches have rapidly multiplied throughout the country, and few towns of any importance are now without one. Some have been built by individual rich Catholics, and are good specimens of architecture: for example, the church at Arundel, built by the Duke of Norfolk in 1873, or that at Cambridge, built by Mrs. Lyne Stephens in 1890; and a certain number of handsome churches have been built by subscription, a prominent instance being the Oratory at Brompton, opened in 1884. Moreover, the influence of the elder Pugin, who was a Roman Catholic, is largely visible in the churches set up during the early days of the Gothic revival. Nevertheless, the large majority of Catholic churches bear evidence of the poverty of that community as a whole, and have been built with the sole view of securing a maximum amount of accommodation at a minimum of cost.

In their practical working the missions do not differ much from parishes, though they are not canonically constituted as such. The clergy, being unmarried, live together in a house or "Presbytery." They are supported entirely by voluntary contributions. For the most part they lead laborious lives, ministering to the wants of their people, most of whom belong to the poorest classes. There is also a large section of the clergy known as "Regulars," including Jesuits, Benedictines, Dominicans, Franciscans, as well as the modern Redemptorists, Passionists, and other similar congregations. They commonly live in monasteries or large houses; but in the present state of England they often find themselves obliged to undertake the care of missionary churches, like the secular clergy.

The Laity.— From what has been said, it will be seen that the Roman Catholic laity belong to three very heterogeneous groups: (1) The hereditary English Catholic, consisting of a number of county families, and in some few districts, such as Lancashire and parts of Yorkshire, and elsewhere, some of the working classes; (2) converts, or children of converts, of whom there are usually a certain number in most town missions; and (3) those who are Irish, or partly Irish, by descent, who form the majority of the congregations, many of them belonging to the poorer classes of the population. The prejudices of former times are steadily dying away, and Roman Catholics in general live on good terms with their neighbors. They intermarry to a certain extent, but such "mixed marriages," as they are called, are discouraged by the ecclesiastical authorities and a special permission is requisite for each. Many Roman Catholics may now be found occupying prominent positions on county councils, boards of guardians, or other public bodies. In politics, owing to the composite nature of the body, they are divided, almost every shade of political opinion being represented amongst them; but in general it may be said that while the majority, including almost all the Irish, sympathize with the Liberal party, many of the upper class hereditary Catholics have in recent years become strong Conservatives. When Catholic interests are at stake, however, those of all political views unite on a common platform.

Education.— Very remarkable energy and perserverance has been shown in providing elementary schools for Catholic children, and there is one attached to almost every mission. In spite of past difficulty and poverty, they have usually been carried on very efficiently. Training colleges for the supply of Catholic teachers, both male and female, exist in various parts of the country. There are numerous poor law, reformatory and industrial schools. In the provision of secondary day schools Catholics are less well off, though there are a certain number of efficient ones in some of the chief towns; but the boarding schools for the upper classes are on a very large scale in proportion to their numbers. The chief ones — Stonyhurst, Ushaw, Beaumont, Downside, Ampleforth, Old Hall, and others, are all equipped fully up to the standard of modern requirements. Some of them are descended from the English colleges on the Continent which were broken up during the French Revolution; others, as for example Cardinal Newman's school at the Birmingham Oratory, have been founded in more recent times.

Until a few years ago, Roman Catholics were forbidden to attend the National universities; but in 1895, in response to a petition from the laity, the law of the Church was relaxed, and there are now many Catholic undergraduates at Oxford and Cambridge. They are scattered in the various colleges, and mix freely in the general life of the university, but there is in each case a centre, where lectures on Catholic subjects are given periodically, and there is a Catholic Debating Society both at Oxford and at Cambridge.

Convents, Charities, etc.— One of the features of Roman Catholic life in England during the last 50 years has been the rapid multiplication of convents. In a large number of cases the nuns devote themselves to the work of education, either in the parish (primary) schools, or by conducting a secondary school of their own, either for boarders, or day scholars, or both. Others work among the poor, or undertake the care of the sick or the aged, or the unfortunate, while a certain number belong to “enclosed” orders, and give themselves to a life of prayer. Many other homes, orphanages and “rescue” societies deserve to be enumerated; nor ought we to omit at least a mention of the Catholic Truth Society, for printing and distributing cheap Catholic literature among the poor, in these days an essential provision for Catholic life.

Bibliography.— For details of the present state of Roman Catholics, see ‘Catholic Directory,’ published annually under authority.

The following books may be consulted on the history of the Roman Catholics in England, from their point of view: Dodd's ‘Church History of England’ (Dodd's real name was Rev. Hugh Tootell. His history was published 1737–42); Tierney's ‘Dodd.’ (The notes of Canon Tierney form a very valuable addition, and make this practically a new book; but it breaks off at about 1640, and was never finished. It was published in 1839–43. Both editions of Dodd are often met with in second-hand catalogues); Lingard's ‘History of England’; Sander's ‘Rise and Growth of the Anglican Schism’ (Lewis's translation [1877], the Latin original [1585] having run to over 30 editions); Challoner's ‘Memoirs of Missionary Priests, 1577 to 1664’ (1st ed., 1741–42; many times republished); Berington's ‘State and Behaviour of the English Catholics from the Reformation to the year 1780’ (London 1781); Butler's ‘Historical Memoirs of English and Scottish Catholics’; Milner's ‘Supplementary Memoirs.’ (These two books formed part of a long and acrimonious controversy on Catholic affairs between Bishop Milner, Vicar Apostolic of the Midland District, and Charles Butler, the distinguished lawyer, who on the passing of the Emancipation Act in 1829 became the first Roman Catholic K. C. Butler's Memoirs appeared in 1819, and Bishop Milner wrote to correct what he considered misrepresentations of Butler. Both books are still fairly commonly to be found); Husenbeth's ‘Life of Milner’ (1862); Flanagan's ‘History of the Church in England’ (1857); Olliver's ‘Collectanea’ (1857); Ullathorne's ‘History of the Restoration of the Catholic Hierarchy’ (1871); Mazière Brady's ‘Annals of the Catholic Hierarchy’ (1877); Foley's ‘Records of the English Province S. J.’ (8 vols., 1877); ‘Records of English Catholics’ (edited by Knox); Vol. I, ‘Douay Diaries’; II, ‘Letters and Memorials of Cardinal Allen’ (1878–82); Amherst's ‘History of Catholic Emancipation’ (1886); Morris, ‘Catholic England in Modern Times’ (1892); ‘The Catholic Church During the Last Two Centuries’ (Lord Braye's Prize Essay 1892); Bernard Ward's ‘Catholic London a Century Ago’ (1905); Gillow's ‘Biographical Dictionary of English Catholics’; Wilfrid Ward's ‘Life and Times of Cardinal Wiseman’ (1897); Purcell's ‘Life of Cardinal Manning’ (1896; a book full of inaccuracies, but containing much valuable documentary matter).

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40. ENGLISH JUDAISM. Historical Summary.— Though the statements as to the presence of Jews in Roman and Saxon England are more or less legendary, it is tolerably certain that William I brought a number of Jews with him from Rouen to England. Under the Normans, the Jews enjoyed some privileges; they developed a communal life of culture and distinction; but they were practically restricted to financial pursuits as a means of livelihood. Henry I granted them a charter, but at the coronation of Richard I serious massacres occurred in London and elsewhere, especially at York, where the ordeal of martyrdom was heroically endured. The “Exchequer of the Jews” was then founded to preserve the Jews from some of the effects of such riots and to enable the Crown, as chief partner in the Jewish money-lending business, to secure its share of the gains. By the middle of the 13th century the Jews were chattels of the King, and their unpopularity on religious grounds was increased by the power they gave the King to obtain a revenue independently of barons and people. In 1275 the *Statutum de Judaismo* forbade the Jews to lend money, and as there was no other function for them in feudal England their expulsion followed as a matter of course in 1290. For the next three and one-half centuries a few Jews visited England from time to time; Queen Elizabeth had a Jewish physician. Toward the middle of the 17th century a number of Marano merchants came to the front in English colonies and in England itself. These men, who had escaped the Spanish Inquisition by assuming an outward garb of Roman Catholicism, now boldly asserted themselves as Jews, and in 1655 Cromwell, as a result of the Whitehall Conference of that year, connived at the open resettlement of a Jewish community in England. But two centuries more were to pass before the English Jews obtained full civil and political emancipation. In 1753, Pelham prematurely passed a naturalization bill, which he was forced to repeal next year. The struggle recommenced in 1830. In the years 1828–29 Protestant Dissenters and Roman Catholics were relieved of most of their disabilities. But the Jews were still excluded from Parliament, from membership of the University of Oxford, and from degrees and posts of emolument in the University of Cambridge. Nor could they occupy high posts in the army or navy. Political emancipation was won in 1858. In 1870, following on the senior wranglership of a Jew, the University Tests Act conferred full scholastic rights on the English Jews. In 1858 Baron Lionel de Rothschild took his seat as a member of the House of Commons, and in 1885, his son, Sir Nathaniel de Rothschild was raised to the peerage — the first Jew so distinguished. Since 1858, many English Jews have sat in Parliament; there has been a Jewish Master of the Rolls; in 1915 Lord Reading, a Jew, became Lord Chief Justice of England; and in the civil, military and diplomatic services a goodly array of Jews has become prominent.

Statistics.— In 1290 the number of Jews who left England amounted to 16,000. At the Restoration of Charles II there were about 40 Jewish families in London. The increase was slow in the 17th century, but toward the end of the 18th century there was a larger immigration. Colquhoun estimated the Jewish population of London as 20,000 at the beginning of the 19th century, which would bring the total for the British Isles to about 25,000. This estimate is probably too high, for it is doubtful whether there were more than 60,000 Jews in the country before the Russian immigration of 1881. Mr. Jacobs calculated that in 1901 there were nearly a quarter of a million Jews in the British Empire, of which number 160,000 were in the British Isles. In 1915 there were about 245,000 Jews in the United Kingdom, with 200 synagogues.

Organization.— Since the dispersal of the Jews from Palestine in the first centuries of the Christian era, the organization of Jewish communities has been almost invariably on an independent congregational basis. Each congregation in the mediæval period constituted an independent unit. Sometimes there would be a combination of these units for certain purposes, as in the famous council of Four Lands in Poland (c. 1550–1750). In the pre-expulsion period in England, there were officials who bore the title «Presbyter Judæorum» and who were the acknowledged leaders of the whole Anglo-Jewish community. Such officials were closely connected with the royal finances in so far as they affected the Jews, and were more or less responsible for assessments of talliages. When the Jewish community was re-established in the 17th century, the old congregational system was restored. There was first the Sephardim or «Spanish and Portuguese» Congregation which for long took the first place in the guidance of the whole Jewish life of London. Founded by a body of men distinguished alike for culture and commercial capacity, this congregation gave to English public life many a noble son. They bore a considerable part in developing Colonial trade. This congregation, whose present Bevis Marks Synagogue was consecrated in 1701, was governed by a Mahamad or Council of Elders with an ecclesiastical head or Haham. The Mahamad claimed and exercised considerable power over all the individual members. Gradually, however, the leadership passed into the hands of the Ashkenazim or «German» Jews. At first each German congregation was completely independent, and this condition continued with more or less completeness till 1870 when the United Synagogue was founded. A large number of Metropolitan Jewish congregations are constituents of this united body, but the Sephardim have maintained their complete independence, and besides a few German congregations of old foundation which have remained outside the union, there was established in 1841 a West London Synagogue of British Jews which introduced some ritual reforms and placed itself (as it still remains) in an independent position. The increase of foreign Jews had, however, led to the formation, especially since 1880, of a considerable number of smaller East End congregations outside the Metropolitan Union. These were «federated» in 1887. It is difficult to define the exact condition of the Jewish communal organization at the present time. The Chief Rabbi is the official head of the great bulk of the congregations of the British Empire, but except for statutory powers conferred over the constituent Synagogues of the united Synagogues by the act of 1870, the influence of the Chief Rabbi depends on the voluntary acceptance of his jurisdiction by the various congregations. As to the rest of the communal organization, it does not differ from that found in other Jewish centres all the world over. The distinctive mark of Anglo-Jewish arrangements is perhaps the tendency to centralization. In Germany and in America there are Rabbis for every separate congregation; in England there are «Ministers» who preach and teach rather than Rabbis who exercise judicial functions. But there are many indications that the centralization is in process of breaking down. Certainly the organization of the English Jews on its religious side is now in a transitional phase. On the other hand, charitable and philanthropic organization is in a condition of first-rate efficiency.

The Communal Life.— Cromwell readmitted the Jews unconditionally, and though the acquisition of political rights was a slow process, the English Jews were never subjected to restrictions of the Ghetto type. On the other hand, the fact that emancipation in England was gradual and not sudden gave the English Jews a training in civic adaptability which had rather exceptional consequences. The Jew easily assimilates, but in England assimilation was not accompanied with any wide-felt desire to forsake Judaism. The English Jews who have taken the lead in serving the state have on the whole been identical with the English Jews who have served the synagogue. The Disraeli family was an exception that proves the rule. But while English Judaism thus gained in coherence and stability by the fact that the leadership of the community was in the hands of its chief men of affairs, the communal life suffered some loss of idealism. English Jews have, indeed, consistently taken the lead in dealing with crises in the fate of the Jews of the world, but on the whole, communal life was respectable rather than brilliant. The institutions which resulted were, however, striking examples of practical philanthropy. The Board of Guardians for the relief of the Jewish poor (founded in 1859) occupies a high place among institutions of its class. It not only prevents the Jewish poor from falling on the rates, but it takes an enlightened view of the aims of poor-relief, fostering self-help by a carefully organized system of loans and emigration. Another characteristic institution is the Jews' Free School (founded 1817). This is probably the largest school in England, and it has served the cause of education while at the same time providing a friendly atmosphere for the children of alien parents. Considerable changes have followed on the increase of foreign Jews. The whole communal life has been vivified. In the first place, the presence of these Jews for the first time made evident a passing wave of anti-Semitism which culminated in the futile Alien Bill. Anti-Semitism has no deep roots in England, but the anti-Alien agitation did undoubtedly rouse the Jews of England to a sense of their responsibilities. Again, the Zionist and Territorial schemes introduced some of the previously lacking idealism. The absence of Jewish Mission deprives the Jews of a powerful driving force. But there is one important Jewish missionary society — a society of Jews with a mission to Jews. The Anglo-Jewish Association (founded 1871) has, under the enlightened presidency of Mr. C. G. Montefiore, had its horizon widened partly by the Hirsch Colonization Scheme which is directed in part by the Anglo-Jewish Association, and partly by the revived interest felt in the Jews of the world in consequence of the propaganda of Dr. Herzl and Mr. Zangwill. The Russian persecutions had considerable influence in the same direction. The general result has been that the leadership of the community is passing from the men of affairs to the idealists, and though there would be serious danger were this process carried too far, there can be little doubt that the change is on the whole fraught with advantage. As another token of present-day idealism may be instanced the initiation of a literary revival. English Jews have not played a foremost rôle in the promotion of Jewish learning. While the 'Dictionary of National Biography' was edited for the larger part by a Jew (Sir Sidney Lee), and the British Academy was founded by another Jew (Israel Gollancz), though Jews have filled professorial chairs at the Universities and though there have been two Jewish R. A.'s, the literary performances of Jews in the field of specifically Jewish learning have been insignificant. But a new spirit is now discernible, or rather the old Jewish spirit has invaded the English Jewry. Thus, without enumerating the many institutions which are the just pride of the community, without detailing the eminent service to the state rendered by English Jews, it may be said generally that the practical spirit which has so long directed the current of Jewish life is now receiving a long-needed infiltration of idealism. In no part of the world is there greater hope for Judaism. Fullest toleration is enjoyed and more than toleration, sympathy. Fullest civic and political rights are the possession of English Jews. And above all there is undoubtedly a genuine affection for Judaism. Official Judaism is not in a thoroughly healthy condition, but there is in the general mass of Jews a sturdy confidence in the religion and an immovable hope in its power to civilize and save sobriety, good citizenship, devotion to the state, and a practical appreciation of all humane virtues are being once more touched by the fire of enthusiasm. Judaism is not only a creed and a code, it is a life. In England this principle seems likely to reassert itself. The English Jew is pre-eminently an Englishman, and he may become at one and the same time pre-eminently a Jew.

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41. BRITISH EDUCATION.

Introductory.— For a history of the early days of British education the hour has not yet come. Even the origin of the two ancient universities remains obscure. The records of secondary schools, with very few exceptions, do not begin before the Reformation, though the claim of King Edward VI to be a patron of education has been shown to rest rather on having attached his name to a portion of the older foundations, of which a considerable number were destroyed under the Chantry Act of 1547. Elementary education was a matter too humble to receive much definite permanent record, and probably, as in Scotland till recent years, it was frequently given in the same schools in which the elder children were being prepared for the universities. Neither taxes nor rates were levied for education before the 19th century (to speak in general terms), and the only method of maintaining any permanent educational institution was by means of endowment. Considerable sums were devoted to this end in the reign of Elizabeth, and, after the troubles of the civil wars were over, there was an outburst of endowment in the end of the 17th and beginning of the 18th centuries.

ENGLAND.

Elementary Education.— Two important factors in spreading elementary education were the Society for Promoting Christian Knowledge, founded in 1698, and the Sunday school movement, crystallized in the foundation of the Sunday School Society in 1785, and representing largely the Evangelical Revival of the 18th century.

The educational work of the Society for Promoting Christian Knowledge was in 1811 transferred to the «National» Society (The Society for Promoting the Education of the Poor in the Principles of the Established Church), which for the time being was devoted to carrying on schools on the «Madras» monitorial system, as organized by Dr. Andrew Bell. In 1808 a society, known subsequently as the British and Foreign School Society, was founded, chiefly by Nonconformists, to establish schools on an almost identical system which had been developed by Joseph Lancaster. The provision of elementary schools in England and Wales was thus in the beginning almost entirely the work of those connected with religious bodies, of which the Church of England was numerically and financially by far the most important. These voluntary schools, aided since 1833 by gradually increasing grants from government, continued to hold the field alone until 1870. Since the introduction of board schools, supported by rates, at that date, and even since 1902, the voluntary managers have gone on raising considerable sums of money, which, however, of late years, have been devoted chiefly to building and maintaining the fabric of their schools.

The religious difficulty in English elementary schools has thus been involved in their very origin.

It was not till 1833 in the first Reform Parliament that the State came to their aid. In that year the House of Commons made a money grant of $100,000, which was apportioned between the two societies, and it was not till 1839 that the government education department for directing the administration of the grant was establishel. The grant was gradually increased, and between 1850 and 1860 rose from $725,000 to $1,000,000 for Great Britain. In 1880, it was $12,500,000 for England and Wales only, and now is over $55,000,000 for elementary education. The years between 1840 and 1860 were years of great expansion. The population, which in 1821 had been under 9,000,000 in England and Wales, by 1861 numbered 20,000,000. The government education grants greatly encouraged the clergy of all denominations, and schools sprang up in all directions. In 1861 the economists took fright, and severe mechanical tests were applied to the system of grants by the «Revised Code.» Payment was to be made only on the results of individual examination of every pupil, in reading, writing and arithmetic. Undoubtedly some check was needed on a system advancing so rapidly and with teachers so ill prepared as many were for their profession. But the method adopted was disastrous, and its cramping influence is felt in the traditions which exist to-day, years after the last relics of this method of payment by results have been abolished.

By 1870 it was quite plain that, magnificent as the efforts of the churches had been, nothing short of a national local system could provide the necessary schools, especially in the large towns. The Elementary Education Act of that year enabled boroughs and parishes to form school boards, with powers (if necessary) to levy a rate for building and maintaining schools in addition to the building grants and other grants from the State. The central education department had after due investigation to declare what school accommodation was needed in each district. If in any case it were not duly supplied, they might order the formation of a school board; and in case of further default appoint such a school board themselves. Existing voluntary schools were to receive the government grant, but no aid from rates. They might still give such religious instruction as they thought fit. In the board schools no religious catechism or religious formulary distinctive of any particular denomination was to be taught. This regulation is known as the Cowper-Temple Clause, from the name of the member who introduced it as an amendment. Subject to this a school board might give in its schools such religious instruction as it thought fit, or might abstain from giving any. As a matter of fact, except in some places in Wales, where the religious instruction is given in Sunday schools, plain Bible lessons are given by the ordinary teachers in all these schools with very few exceptions. Any school board might make by-laws enforcing the compulsory attendance of children between 5 and 13, subject to a conscience clause, and a number of school boards were established for this purpose only. In 1876 attendance was made compulsory in *all* districts by the establishment of school attendance committees where no school boards existed. The provisions for compulsory attendance have been strengthened and diversified by four subsequent acts, and are further complicated by conflicting Factory and Workshop Acts, so that the whole now urgently need consolidation. In 1891 fees were abolished in most schools, a process nearly completed since 1902.

The act of 1870 aroused the most intense opposition at once from the Church party and the extreme Nonconformists. The latter were disappointed of their hopes of a uniform national system, the former found themselves in competition with a rival subsidized by the State. The greatest activity prevailed on both sides in providing additional schools. Between 1869 and 1876 provision was made in elementary schools for 1,600,000 additional children, and of these two-thirds were in voluntary schools, toward the cost of which only one-fifteenth was paid in government building grants. Educational enthusiasm was not, however, the sole factor; in many cases the chief ratepayers realized that they could build and maintain the schools far more cheaply by voluntary subscriptions than under the administration of a school board, and large corporations such as railway companies, were willing to contribute to voluntary schools for similar reasons. The voluntary system had proved wholly inadequate in the large centres of population, but still prevailed in the majority of country villages.

By the end of the century the time was ripe for further legislation. Secondary education was in chaos, and it was imperative that it should be co-ordinated with the elementary system. The development of the latter moreover was in many places completely at a standstill and unlikely to be further improved under existing conditions. The tendency to local self government had rapidly increased during the past few years. In 1888 the Local Government Act established county councils, and in 1894, by another act, district and parish councils were constituted. In 1889 the Technical Instruction Acts had authorized the county and borough councils to supply technical instruction, and the vast majority of them were spending for this purpose the large sums of money handed over to them in 1890 by the Local Taxation (Customs and Excise) Act. They had thus already some experience as education authorities. On the other hand, the requirements of the education department (which in 1899 had been reorganized as the board of education) had been steadily growing, in accordance with modern ideas of education, so that the voluntary schools began to find it impossible in most cases to obtain the money requisite to keep them efficient.

Accordingly in 1902 a fresh Education Act was passed. By this every county, every county borough (i.e., to speak roughly, city of more than 50,000 inhabitants), and (for elementary education) every urban district of over 20,000 inhabitants and every non-county borough of over 10,000 became local education authorities, and all school boards were abolished. Each new authority must appoint, according to a scheme approved by the board of education, an education committee, which they are bound to consult, and to which they may delegate all powers for education except that of raising money. The voluntary schools must give their religious teaching in accordance with the terms of their trust deed (if any), and it is under the control of their managers. They appoint and dismiss their own teachers, subject to the consent of the local authority which pays them. The voluntary managers are responsible for the upkeep of their buildings, subject to an allowance from the authority for internal fair wear and tear, but the local authority is bound to maintain and keep the schools efficient otherwise, at its own expense. Each voluntary school is managed by a body of managers, usually six, of whom two-thirds are appointed under the trust deed, amended by Order if necessary, and one-third by the local authorities. Board schools are now known as council schools. The managers are appointed by the local authorities. In counties two-thirds are appointed by the county council, and one-third by the local district or parish council. To the managers such powers are at present delegated as the central local authority thinks fit. London was excepted from this measure but received an analogous act in the following year.

Unsatisfactory as many of the provisions of this act were to the politician and to the religious controversialist, there can be no doubt that from the point of educational administration over the country as a whole, it has brought about great progress, an advance proportionately almost as great as the act of 1870. Even in those cities where there was already a strong progressive school board, it has concentrated the powers for higher as well as for elementary education in the hands of one authority, has materially increased the grant, and has given considerable powers over the standard of accommodation and of staffing in the elementary schools. In the counties moreover it has abolished the small rural school boards, whose sole object was to reduce expenditure, and has placed in charge an authority which can apply a reasonably high and uniform standard of efficiency in staffing, in school accommodation, in hygiene, in school material, in school attendance, and even in the small, but important matters of school cleaning and offices.

On the other hand the act of 1902 met with the most violent antagonism from the enemies of the voluntary school system. It was urged with good reason that complete maintenance from the public funds should be accompanied by full public control, that no denomination should be allowed to have instruction in its tenets given at the public cost, and that in any parish where there is only one school, the children of the minority, who have no alternative but to attend it, are liable to suffer from a stigma attached to the exercise of the conscience clause. Nonconformist teachers moreover found it difficult to obtain engagements in church schools or places in training colleges of which very few are undenominational. The Church party on the other hand were not unreasonably unwilling to allow only undenominational religious instruction to be given in schools which they had built, largely at their own expense, for denominational instruction, and claimed a right to have such instruction for their children.

A complex Education Bill passed the House of Commons in 1906, but fell through. Another, in 1908, went no further than a second reading. In 1914 there was approximately one certificated teacher to every 49 scholars in England and to every 60 in Wales. Important changes have been made since 1911 in the training of teachers. There were 13,093 training colleges in England and Wales in 1916. In 1914 provision was made for feeding poor children in addition to educating them. During the first year 39,596,018 meals were supplied to 421,975 children. All pupils undergo medical inspection. The total expenditure on elementary education in England and Wales for 1913–14 amounted to $71,843,970, for 21,498 schools with an average attendance of 5,420,000 scholars.

English Secondary Education.— The best defense of English secondary schools at any rate during the past century, is that they have successfully educated a large number of men of high character and ability who have served the nation well in political and administrative life, not only in England, but all over the world. There was, however, till recent years, nothing that could be called a system. Each school utilized or abused its endowments and its opportunities, and the abuses were very slowly revealed by the inquiry of royal commissions, and still more slowly corrected. Although inquiries began in 1818 under Brougham, it was only in the «sixties» that the reports of the commissions on the great «Public Schools» (nine in number) and on the endowed schools led to two acts of reform, the Public Schools and the Endowed Schools Acts, and under these most of the abuses of endowments have been brought to an end.

But in the leading English «Public Schools» (i.e., the leading secondary schools for boys, and principally for boarders), a considerable measure of reform had come in early days from within. The twin names of Arnold and Rugby are best known, but the Rugby reform was in part inspired by Winchester, and great names are not wanting to Eton and Harrow which with the many glaring defects they possessed at that period were relatively efficient. From Arnold and his successors, Temple and Percival, influence radiated and few schools failed to become different, whether by attraction or repulsion. Thring at Uppingham, Vaughan at Harrow, Cotton and Bradley at Marlborough, Bradley at Haileybury, were mighty instruments in "changing the face of education all through the public schools of England."

Not only have science and modern languages been introduced, as well as opportunities for the arts and manual instruction, but the teaching of Greek and Latin has to a great extent been remodeled. Physical development, which was always encouraged in those schools by games, has been pushed to a degree which now makes against intellectual interests. Nearly all the so-called first grade schools are boarding schools, and consequently the corporate life gives far greater scope to the influence of masters and of boys, and thus to education in the widest sense, than is possible in day schools. For good or evil, the effects are more marked, and on the credit side must be set that independence and self-reliance which the best schools produce.

The first chief influence of modern science on the schools' curricula came from a separate government department founded in 1836 as a school of design. In 1853 this was reconstituted as the department of science and art, largely by the influence of Prince Albert, and partly as a consequence of the first international exhibition held in London in 1851. This department began to hold examinations and make grants for teaching of science and art, and ultimately extended its subsidies to schools recognized by it as "Organized Science Schools," in which regular courses of instruction in science were given. In 1900 the new board of education absorbed the department of science and art, and also the education department dealing with elementary schools. It thus became the sole central authority, and in 1901 began to give grants to approved secondary day schools with regular courses. It has also in connection with these grants developed a very full and valuable system of inspection conducted by its own staff. In 1902, as already mentioned, the county and country boroughs became education authorities, the minor localities possessing only concurrent jurisdiction with the counties in higher education. Since 1902 these authorities almost without exception have made considerable annual grants to the secondary schools in their areas, and a marked improvement is already visible in the efficiency of the schools, and the length of attendance of the pupils. These grants of course are given almost entirely to the smaller schools. The endowments and fees of the first grade "Public Schools" render them independent of such assistance and consequently of the board of education. In 1914 there were 910 grant-aided schools, all free to children from the public elementary schools.

Mixed Schools.— There has been a certain amount of experiment in this direction, and prejudice has to a large extent been dispelled, but on the whole the best English opinion seems inclined to the view that, other things being equal, it is preferable to educate girls and boys in separate schools. There are, however, many places unable to support two separate schools, and in these co-education is being tried with some success. But there is no likelihood of its ever being tried in the older public schools, where the school age does not end before 18 or 19, and this precedent will probably always militate against it in smaller schools.

Curriculum of Secondary Schools.— So far as boys' schools are concerned, not very much liberty is really left to initiate startling reforms. Pupils are prepared for the universities, for civil service, or for army and professional examinations, and it is these which really prescribe the subjects. In addition to the actual university courses most of the universities have followed the example of Oxford and Cambridge in establishing "Local Examinations" and the "Examinations of the Joint Board" for the benefit of pupils still at school. These tests, especially when joined with inspection, have done most valuable service.

Other Secondary and Technical Education. — The science and art department, already mentioned, held various examinations and gave grants to classes and prizes to pupils. But it was the Technical Instruction Act of 1889, and still more the Local Taxation (Customs and Excise) Act of 1890 which encouraged local authorities to spend money on so-called "technical" subjects. The list of these subjects finally included, I believe, everything secondary except the classics. Even Shakespeare is said to have been taught under the head of "Commercial English." These powers brought the councils of counties and boroughs and urban districts into the field as education authorities, and in addition to their grants to secondary schools and their scholarship schemes, they did much to prepare for their future work in secondary education proper. The chief effect of the limitation to "technical" instruction was to encourage the teaching of science subjects, which had never before received proper recognition. This limitation to "technical" instruction was entirely swept away in 1902, when the local authorities received power to administer all higher education as well as elementary. In the last 25 years a large number of "Institutes," "Schools of Art," and "Technical Schools" have been built or enlarged. Marked progress has been made in the education of those persons who during the day are engaged in trades and professions. The quality and scope of the teaching have been considerably improved, and the chief need at present is to secure the attendance of lads and girls who are leaving the elementary schools and to induce them to complete well-arranged courses of not less than three or four years' duration. In 1916 there were 6,097 of these schools.

English Universities.— These may perhaps most conveniently be divided into two classes, the old and the new. In no branch of education has there been a more rapid or startling development than here. In 1826 there were only Oxford and Cambridge, the traces of whose origin are lost in the early Middle Ages. In 1916 no less than seven new universities enjoy a prosperous existence, while there are other university colleges which mav hereafer develop into universities themselves.

The New.— Manchester, Liverpool and

Leeds, federated in 1880 as Victoria University, have recently acquired separate charters. Birmingham, established in 1880 as Mason College, became a university in 1900. Durham, founded in 1832, has been constituted more on the lines of Oxford and Cambridge, except for its association with the college at Newcastle. London, which received its first charter in 1836, was afterward for many years merely an examining body, but at last in 1898 received a new constitution enabling it to embrace all the chief institutions for higher teaching situated in and near the capital, and to distinguish between its internal (or taught) and external (or merely examined) students. Sheffield University received its charter in 1905. It is difficult to do justice to the splendid energy and the magnificent generosity which has founded and worked most of these institutions — qualities which can be more easily paralleled among the universities of America. These institutions are new, they are efficient, they do well a work which needed doing. But as the object of educational study, they are less interesting than the universities of Oxford and Cambridge.

The Old.— It would be hard to explain to a stranger the way in which Oxford and Cambridge have in the past entered into the life of the whole country, attracting to themselves not only the sons of men of rank, position and leisure, but also poor and able lads likely hereafter to make their way both at home and in the world at large. It is probable that no Cabinet will ever again be composed almost exclusively of men drawn from these two universities, but it is equally improbable that any Cabinet will ever lack them altogether. Oxford and Cambridge supply a very large part of that executive civil service to which England owes so much, and of which so little is heard. In nearly every country parish the squire and the parson can still exchange reminiscences of a university common to them both, for in the past the size of the country and of the population rendered it possible for two universities to gather together, widely speaking, the representatives of the governing and teaching classes. If these young men did not always get much learning, at least they grew from boyhood to manhood in an atmosphere of discipline and among their equals. The influence moreover of the beautiful buildings set in an environment of groves and lawns and quiet streams, and the association of national history and literature, were a factor in their education which nothing else could supply. Oxford "as she lies in the moonlight, spreading from her towers the enchantments of the Middle Ages," and Cambridge, her equal and rival, have an influence still reaching deep and wide into the character of the nation.

It must not, however, be supposed that cautious reforms have not adapted these universities to the changing needs of the time. By the beginning of the 19th century examinations were instituted, the best of which have probably done the work possible to examinations as well as it has ever been done. Royal commissions in the middle of the century, and again in 1877 led to the revision of the mediæval statutes and to the abolition of many obsolete restrictions and privileges. All religious tests were finally abolished in 1873. The time has perhaps come round for a new inquiry, but the particular methods of teaching by lectures and by tutorial work are carried out with a thoroughness and care which it would be difficult to surpass. In the past 50 years nine distinct new courses have been added to the curricula both for Oxford and Cambridge graduation, besides new subjects for which diplomas are granted. Museums and libraries, laboratories, institutes and workshops have been freely erected, and only a lack of money prevents further developments. For it is a curious feature of their constitution that in both places eight-ninths of the property belongs to the individual colleges in which the men reside and one-ninth only to the universities themselves.

The Rhodes Bequest.— The most striking departure of recent years has, however, been due to a son of Oriel College, Cecil Rhodes, who bequeathed an income of some $170,000 a year to be given in 60 scholarships to the Colonies, 102 to the United States, and 15 to Germany, all tenable only at Oxford. The result of this policy it is premature to forecast, but the experiment so far has met with success. Oxford has welcomed the scholars, and they have at once found their feet and seem cordially to recognize the distinctive character of the benefits which the university has to offer without being blind to its limitations.

University Extension.— Besides the direct work of the universities, old and new, notice should be taken of their pioneer efforts in developing education by means of lectures. This has proved specially valuable in the development of some half dozen university colleges, of which Reading is the most conspicuous example.

Higher Education of Women.— The education of women has met with many difficulties in England, but except for the refusal of degrees at Oxford and Cambridge, practically all desired privileges are now everywhere open to them. In the newer colleges and universities they are received on the same terms as men, except in certain medical courses. In Cambridge they have two colleges, in Oxford four and they are admitted to all such teaching as they require and to all examinations. Degrees alone are withheld and actual membership of the universities which would involve a share in their government. The universities of Birmingham, Durham, Liverpool, Manchester, Leeds and Sheffield grant degrees to women; there are five colleges for women in and near London, and three in Wales.

WALES.

Introductory.— Of the four quarters of the United Kingdom, Wales has made the most rapid progress. In the middle of the 19th century her elementary education had probably the worst equipment; her secondary schools were inadequate and inefficient; while in higher education she possessed only the recent foundation of Lampeter, which was then little more than a theological college.

Elementary.— The Welsh elementary schools have always been under the administration of the English Board, and, considering the inaccessibility of the wilder parts of the country, have made at least a proportionate progress. Nowhere has more difficulty arisen in the administration of the Education Act of 1902, and a section in the Bill of 1906 provided for the establishment of a separate Education Department for Wales. Teachers and schools probably suffered to some extent, but the future progress of Welsh education is in any case assured. Wales has the educational advantage of being a bilingual country to a greater extent even than Ireland, and this has long been fully recognized in her schools.

Secondary.— Wales, while sharing in the educational inquiries and reforms of England, made in 1889 an enormous step in advance. In that year she obtained the Welsh Intermediate Education Act, under which small joint education committees were established in all the counties and county boroughs, and by this means an admirable system of county secondary schools for boys and girls was established. In 1897 a Central Welsh Board was created to provide for examination and inspection of the different schools which had been created and organized out of the rates and grants placed at the disposal of the joint education committees.

Universities.— In university teaching Wales in a single generation has rivaled the provision of Scotland. A training college was founded in 1862, and the first university college at Aberystwyth in 1872. In 1883–84 university colleges were established at Cardiff and Bangor, and the annual grant they received from government was before long extended to Aberystwyth. In 1893 they were incorporated in the University of Wales, which has since been extended so as to include Lampeter, which, however, has the power of giving separate degrees. Women have been admitted from the beginning to the Welsh university colleges and the university.

SCOTLAND.

Preliminary.— The history of education in Scotland accounts for the virtues and most of the defects in the Scottish system. In the old days the elementary school led direct to the universities, and the universities were hampered by doing the work of secondary schools. On the other hand there were few boys of ability and character who could not get the best education in the country, and the sacrifices they made had a large share in the success so many of them ultimately achieved. To-day the path is easier, the opportunities greater, and the instruction has progressed with the times.

Elementary.— John Knox laid down a scheme for the establishment of a grammar school in every town, but most of the funds intended for the endowment passed into other hands. In 1696, however, a system of schools was established by statute, the landowners being bound to provide a schoolhouse, and a salary for the teacher, in every parish. The salary was small, and the exceptions numerous, but a rate-aided system was actually organized, and owing to the cheapness of the university system, and the frugality of the country, much excellent work was done. The conditions of the teacher and the method of his appointment were gradually improved by statute, though no State aid was forthcoming till 1833. The first Parliamentary grants for elementary education applied equally to Scotland, which was under the English Board of Education until 1872. In that year the first education act for Scotland was passed. In spite of the multiplicity of her religious denominations, Scotland was ready to accept a universal system of school boards, who were left entirely free to teach what religious formulæ they pleased in their schools. Compulsory attendance between five and thirteen was enforced throughout the country under a maximum penalty amounting to as much as five dollars, a sum not reached in England until 1900. A special committee for education for Scotland was now created, which in 1885 was given a separate secretary.

In a general sketch it is impossible to point out the numerous small differences between the Scottish and English systems. Scotland was earliest to escape from the revised code and payments by results, uniform curricula and mechanical inspection; first to provide special treatment for blind and deaf children; first to secure free education, and to improve her physical training. A Scot may be pardoned if he sums up the main results by saying that the outlook is generally more from the education standpoint, the teacher more fervid and better educated, and the children more eager for knowledge. The religious difficulty has been entirely avoided, and that in the chief home of religious controversy. A mention should be made of the celebrated Dick bequest which in the northern counties has done much to improve the quality of the teaching by subsidies to better qualified teachers. This also has materially assisted children from elementary schools ultimately to fit themselves for a university education. A bill to introduce certain reforms into the organization of the system and increase the powers of the school boards, has twice been introduced into Parliament, but has not yet been passed, though Scotch members now appear fairly agreed on its merits.

Secondary and Higher Education.— In spite of Knox's comparative failure there were burgh schools and academies established in nearly all the burghs by 1866, and the existing endowments, though capable of better use, had never been greatly abused or misappropriated. A leaving certificate has been organized with much success by the Education Department, which holds the necessary examinations, as well as inspecting higher class schools. In 1914 there were 19,780 pupils on the rolls.

The science and art teaching formerly conducted under the auspices of South Kensington was in 1897 transferred to the charge of the Scotch Education Department. Technical instruction in the United Kingdom may be said to have had its rise at Glasgow in Anderson's Institute, but the cheapness of the universities and greater facilities for general education has always prevented much specialization on purely technical subjects.

Universities.— In no respect has Scotland fared better than in the number and accessibility of her universities. Saint Andrews (1417) with three colleges, Glasgow (1450), Aberdeen (1494) with two colleges, and Edinburgh (1582) afforded every opportunity that the poorest student could wish. It was necessary to attend lectures, but there was no residence in college, and the long summer vacations were used by poor students to earn their fees for the winter. The chief reforms which have been carried have been to raise the minimum requirements for graduation, to make fees uniform, to admit women, to provide adequate buildings, and to endow new subjects of instruction. The greatest liberality has been shown in providing funds for the last two of these purposes, and the universities are now well housed and well staffed. Mr. Andrew Carnegie in 1901 gave $10,000,000, the income of which is to be spent equally between the endowment of certain branches of study and research, and paying the fees of poor students. The latter half of the bequest seems unlikely to benefit the character of a class which would formerly have found such assistance unnecessary, but the value of the portion applied to the endowment it would be difficult to exaggerate.

Ireland.

Introductory.— In Ireland the state of education has been most deplorable, and is still far behind the rest of the kingdom. This is due to poverty, to politics, and to religious bigotry. The difficulties caused by bigotry and politics when a Protestant minority was in power in the earlier half of the 19th century caused those who were responsible for elementary education to steer a cautious and ineffectual course; a different set of difficulties due to the same causes, working through the priesthood and the politicians, prevent any thorough reform to-day. And always the grinding poverty of the nation as a whole has hindered the schools and the teachers from being brought up at any given time to the standard which prevailed in English or in Scottish education.

Elementary Education.— Till the end of the 18th century Catholic schools were illegal, and existed chiefly as «Hedge Schools.» Considerable funds were spent, chiefly in encouraging proselyting institutions. In 1831, however, the present system administered by the Board of Commissioners of National Education in Ireland was introduced, and has continued without any sweeping changes to this day. Elementary education is controlled by 20 Commissioners. Their report (Jan. 1915) showed 8,207 schools with an average of 700,265 pupils, and an average daily attendance of 72.6 per cent. Roman Catholic schools number 4,441, with 389,437 pupils, and 1,553 Protestant schools with 116,969 pupils.

The most hopeful feature in Irish education in recent years has been the establishment of the Department of Agriculture and Technical Instruction, created in 1899, which, beside administering technical instruction, has acted as the adviser of the National Commissioners with regard to teaching agriculture and elementary science in the elementary schools, and in enabling the teachers to obtain instruction in these and kindred subjects. The report of the Belmore Commission, in 1898, showed the most deplorable backwardness in all modern developments of primary instruction. Progress *is* being made, though it will naturally take years to overcome the neglect and ignorance of ages.

Secondary Education.— The chief agent in secondary education in Ireland, apart from the board which administers the endowments, and before the establishment of the Technical Instruction Board, has been the Commissioners of Intermediate Education. In 1878 this board was founded and endowed with five million dollars from the funds of the disestablished Church of Ireland. In 1890, $250,000 a year were added to this income. The money, however, has been awarded on the results of examinations, and before the system was reorganized in 1902 the whole scheme was one of payment-by-results run mad. In 1913 an act was passed providing for grants, and in 1914 an annual sum of $200,000 was granted by Parliament toward the salaries of teachers. The Technical Instruction Board is doing most admirable work and is being well seconded by the county councils.

University Education.— The Elizabethan foundation of the University of Dublin and Trinity College, which practically form one body, has throughout its career had a marked success as a Protestant university on the lines of Oxford and Cambridge. Tests were abolished to a great extent in 1793, and finally in 1873, but the Catholics have never as a body accepted Trinity as a national institution. The three Queen's colleges, founded in 1845, have had even less success in this respect, and the Queen's University, in which they were amalgamated, was replaced in 1879 by the Royal University of Ireland. As Secretary of State for Ireland, Mr. (now Viscount) Bryce formulated in 1907 a scheme whereby Trinity College, Queen's College and a new college for Roman Catholics were to be merged in a new «University of Dublin,» but the plan was opposed by the Dublin University Defense Committee and the Irish bishops on religious grounds. The British government then proposed to establish one university in Dublin and another in Belfast, the former for Catholics and the latter for Protestants, although no religious tests were to be enforced in either. Finally, the National University of Ireland was founded in Dublin and the Queen's University of Belfast in 1909. The former makes a specialty of the Irish language — a compulsory subject of matriculation, while the latter grants degrees, exhibitions and scholarships alike to female and male students. The report for 1914–15 gives approximately 347 teachers and 2,620 students in the Irish universities. The number of male students is necessarily influenced by the war.

Higher Education of Women.— Women have been admitted to the examinations and degrees of the Royal University from its foundation, and have since been allowed to attend the lectures of the Queen's colleges. For a long time Trinity College and the University of Dublin would not admit them either to lectures, examinations, or degrees. The examinations were conceded first, the lectures followed; and now women who have been at Oxford and Cambridge, and require a degree for teaching or other purposes, obtain it freely at Dublin and Belfast, which thus drive a flourishing business at the expense of their less progressive rivals.

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42. ENGINEERING IN GREAT BRITAIN. Engineering as a profession is only partially organized in Great Britain. To understand the present state of development a brief historical statement is necessary.

Historical.— On the military side engineering is and has been thoroughly organized. Fortification and the art of constructing defenses are probably as old as society. The Babylonians, Greeks and Romans showed skill and originality in design and construction which has nowhere been surpassed. From the introduction of the catapult, ballista, and other engines of war amongst the Greeks and Romans mechanical skill likewise received wide and steady development.

Into Great Britain engineering was probably first introduced by the Roman invasion and then languished until William the Conqueror brought with him a large body of engineers who built the castles, fortresses and strongholds, and made the engines of war for defense and attack. A "chief engineer" supervised an organization of trained workmen in the 13th century, and official records of the siege of Calais in 1347 gives a full list of the staff and also of that of the engineers' headquarters at the Tower of London in 1350. Sir Richard Lee was the most famous of the engineers who in the reign of Henry VIII built the English and French coast defenses. Under Charles II a separate corps of engineers, commanded by a surveyor-general of the King's works, was established in Ireland.

As gunpowder, cannon and later muskets replaced catapult, arquebus and crossbow, mechanical skill and ingenuity made steady advance until at the present day the manufacture of war implements and their invention and design have passed to a considerable extent into the hands of civilians. Military engineers are organized as the Corps of Royal Engineers with their headquarters at Chatham.

The artillery is organized in several corps, according as service in the fortress, field, mounted, or on foot, is required. Knowledge and training in a specialized branch of engineering is needed for these services.

Guns and military equipment are manufactured at the Royal arsenal at Woolwich and at the Royal small arms factories at Enfield and Birmingham, under army control, and in various factories belonging to civilian firms.

In the navy engineers have steadily increased in importance as the construction of ships and their working depended more and more upon machinery until under the recently modified regulations it has been arranged that all naval officers whether navigating, gunnery, torpedo, or engineering shall for the first years of their training be educated together, specialization being left to the later years of their course. Engineer officers will therefore rank with other officers of equal standing and be capable of executive command.

On the Civil Side.— The foundation of English civil engineering may be said to have been laid by Smeaton (1724–92). He was the son of an attorney, became a philosophical instrument maker, and subsequently devoted his attention to a study of windmills, canals (for which he made a tour of the low countries in 1754), and lighthouses. He reconstructed the Eddystone lighthouse in 1756. He was therefore "much consulted in regard to engineering projects, including river navigation, the drainage of the Fens, design of harbors, and the repair and construction of bridges."

Smeaton founded in 1771 the "Society of Civil Engineers," the members of which dined together once a month during the parliamentary session and discussed subjects of professional interest. It still exists under the name of "The Smeatonian Society of Civil Engineers." No records of its discussions have been kept nor published but its foundation shows the earliest step in the direction of organizing the non-military engineers into a profession in Great Britain.

Partly contemporary with Smeaton was James Watt (1735 to 1829). He was trained as a mathematical instrument maker, but was prevented from practicing by the trade as not being fully qualified, and therefore he was granted three rooms in the University of Glasgow where he carried on experiments resulting in the creation of the modern steam engine out of the crude pumps of the Marquis of Worcester, Newcomen, Cawley and Savory. His improvements demanded for their perfect fulfillment mechanical skill and workmanship far in advance of the work of the millwrights of his earlier youth. Out of the millwright he therefore created the manufacturing engineer, and did for the *mechanical* side of the profession what Smeaton had done for the *constructive* side, and like Smeaton on the constructive side Watt on the mechanical side was consulted as an authority of the first rank on all important matters.

Watt morever had, about 1767–70, a large practice as a constructive engineer and surveyor, and prepared plans for a number of canals and harbors, chiefly in Scotland.

As manufactures increased, partly owing to the impetus given to them by Watt's inventions, partly as a result of the industrial development at the termination of the Napoleonic wars, the improvement of means of communication and greater rapidity of transit became of first class importance, and as the roads throughout Great Britain were at the end of the 18th century in an execrable condition we find attention more and more concentrated upon the construction of inland canals and new and improved roads.

The man who more than any other aided in this improvement was Thomas Telford (1757–1834), the son of a Dumfriesshire shepherd and in early life trained as a stone mason. After the construction of a house for the Commissioner of Portsmouth dockyard he became surveyor of public works for Shropshire and constructed a bridge over the Severn at Montford in 1792. The construction of the Elsemere canal in 1793 lead to his being employed in the construction of most of the chief canals in Great Britain, from the Caledonian in 1804 to the Birmingham and Liverpool junction in 1825, as well as the Gotha canal in Sweden in 1810. He constructed and perfected most of the main roads in Scotland, the north of England, and Wales, involving the erection of the Menai and Conway bridges, besides numerous others of less magnitude. He also made many continental roads in Austria, and was also employed in harbor construction.

He lived a bachelor in London at the Salopian Coffee House, afterward the Ship Restaurant, and two years after the establishment of the institution of civil engineers in 1818 he was elected president for life. The meetings were thereafter held in the Ship Restaurant, whither the institution removed from the Kendal Coffee House in Fleet street, its earliest home.

Meanwhile, mechanical road traction, steam barge, and ship propulsion had advanced with the advance of the steam engine and with George Stephenson's triumph at Rainhill in 1829, railway construction had commenced and was fast monopolizing attention as the most efficient and rapid means of communication The names of Brunel, Clarke Russell, Whitworth and a host of others claim recognition in the rapid advance of engineering both at sea and on land which now followed, but enough has been said to enable a grasp of the rise of the profession and the lines of its gradual development to be realized.

The progress in organization of the profession which has since taken place has been due firstly to the commanding position in the profession attained by the institution of civil engineers and secondly to the development and organization of engineering scientific education which has taken place in the technical and university colleges and universities throughout the kingdom.

Institution of Civil Engineers.— This institution founded, as already said, in 1818, obtained a royal charter of incorporation in 1828, its objects being — as described by Tredgold in a statement prepared for the council in applying for a charter — «For the general advancement of mechanical science, and more particularly for promoting the acquisition of that species of knowledge which constitutes the profession of a civil engineer, being the art of directing the great sources of power in nature for the use and convenience of man as the means of production and of traffic in states both for internal and external trade as applied in the construction of roads, bridges, aqueducts, canals, river navigation, and docks for internal intercourse and exchange, and in the construction of ports, harbors, moles, breakwaters and lighthouses, and in the art of navigation by artificial power for the purposes of commerce, and in the construction and adaptation of machinery and in the drainage of cities and towns.»

This is the earliest definition of civil engineering and the profession of the civil engineer therefore embraces all non-military engineers who are laboring to «direct the great sources of power in nature to the use and convenience of man» whatever be the special corner of this wide field of operations to which any individual member may be devoting himself.

During the earlier years of the institution's corporate existence the enormous development in the construction of railways, roads, harbors, docks, drainage and waterworks lead to the not unnatural predominance of discussion on questions of special moment to these branches of the profession in the institution proceedings. The council was consequently largely recruited from the men of eminence on the predominating side and the civil engineer became in public estimation more and more exclusively identified with the designer and constructor of such works.

With the rapid improvements which have since taken place in machinery and machine processes and with the revolution which has been affected in commerce and in the requirements and mode of life of the people, by the less prominent but equally remarkable achievements of such men as Stephenson, Armstrong, Whitworth, Bessemer and Siemens, the demands for a greater outlet for the discussion of the mechanical problems of interest on this side of the profession of the civil engineer became more and more insistent and the opportunities available in the existing institution being by many felt to be inadequate, the Institution of Mechanical Engineers was founded in 1847 and was constituted in 1878 as a registered association under the Companies Acts.

With the discovery of the means of practically utilizing electricity for producing light and transmitting power and the consequent extension of its use in all departments of mechanical work a third development took place in 1889, when the Society of Telegraph-Engineers and Electricians which had been incorporated under the Companies Acts in 1883 and from its establishment in 1871 had until 1881 been called the Society of Telegraph Engineers again changed its name to the Institution of Electrical Engineers. Various other societies and institutions have been formed at various dates amongst which may be mentioned the Civil and Mechanical Engineers' Society, the Society of Engineers, and the Institution of Junior Engineers, a very active and progressive institution of which the membership is confined to junior members of the profession.

The Institution of Civil Engineers is thus the parent institution, embracing by its constitution and membership all branches of the profession demanding for entry to its roll (a) practical professional training in works or as an assistant to an engineer; (b) theoretical training as evidence by the passing of its own examinations held twice a year or by the holding of the degree or diploma of a recognized university or technical college; (c) suitable and strictly defined qualifications for each of its classes of membership or studentship.

It is recognized as the leading professional body and membership of its council and occupation of its presidential chair to which there is annual election are the most valued of professional distinctions. It can to a certain extent guide and control professional conduct within its own membership but does so with an all-too-sparing hand. To many it appears that the time is ripe for further extensions of professional organization and for the application of stricter discipline in regard to what may be called, generally, professional etiquette, and it is the Institution of Civil Engineers which alone has the constitution and prestige which would enable it to successfully deal with such a development.

Beside this great leading institution are the Institution of Mechanical Engineers and the Institution of Electrical Engineers, each representing one branch of the profession only, and demanding professional but not examination qualifications for membership. Most of the members of each of these belong also to the premier institution.

To complete the organization of the profession much remains to be done. There is as yet no state registration enabling the assumption of the name civil engineer (embracing, as has been shown above, engineers of all branches) by unqualified and untrained persons, to be checked and fees and professional conduct to be regulated by a governing body, such as the Institution of Civil Engineers, with the help of the other professional institutions, might organize if they had the necessary statutory powers. The public thus lack the protection to which they are entitled against the employment of unqualified advisers whom they have no sure means of distinguishing from competent engineers. One difficulty in the way of this necessary step being taken would probably be removed if the popular misconception of the functions of a civil engineer were eradicated.

This perhaps is more strongly the case in the United Kingdom than elsewhere, for there it has been the custom, where work involving machinery or engineering construction of any magnitude was required by those who were not themselves engineers, to obtain advice as to the best way to obtain the ends in view, and the best engineering designs to employ, from leading members of the appropriate branch of the profession practicing as consultants. There has thus grown up a body of engineers whose function is to give this advice and draw up the instructions upon which tenders can be obtained from engineers who undertake the construction of the works or machinery involved. Much misconception has arisen in America and elsewhere as to the foundation and value of this method. The consultant is in a position of trust between his non-engineering client and the manufacturer. By clearly defining the requirements of his client, after investigating all the conditions of the problem, he enables competing contractors to estimate their prices upon a fair and uniform basis. On the one hand his duty is to see that his client obtains the best installation and that which most satisfactorily fulfils the conditions of the problem on reasonable terms; on the other he sees that no competing manufacturing or contracting firm is unfairly handicapped by a misunderstanding of the problem and by the unfair competition of a rival. Further, his duty is to see that the chosen contractor is not unfairly dealt with owing to the ignorance of engineering possibilities or limitations on the part of his client.

In this capacity, as arbitrator and adviser, the highest qualifications of judgment, independence, integrity, and justice are required of the engineer, and it is of the highest importance that the ranks should be kept purged of any who may usurp these functions without the necessary qualifications and bring discredit upon the profession as a whole. Here statutory powers of control and regulation by a professional body are pre-eminently needed.

Educational Organization.— On this question a brief word must suffice. Engineering schools were first established in London at King's College and University College in the first half of the 19th century. These have been followed by the establishment of other schools in the provinces and in London until a large number now exist in which the scientific bases of engineering are taught in an organized course lasting in general for three years. During that course engineering laboratory training at most schools occupies a large portion of the time. Experimental determinations of the efficiencies of various machines and prime movers working under varying conditions, the strength and properties of materials, flow of liquids, etc., are undertaken by the students, and the underlying scientific laws deduced and exemplified.

In some schools engineering manufacturing processes are also taught and workshop training undertaken, but in the United Kingdom it has generally been held that this branch of training is best obtained in the factories of manufacturing firms, and this is the method advocated by the Institution of Civil Engineers.

The University of London has an engineering faculty and grants degrees in science (engineering), and the University of Cambridge has a mechanical science tripos as an avenue to its degrees in arts.

The provincial universities all grant degrees in science on the engineering side. Dublin and Liverpool alone grant a degree in engineering.

The principle upon which such "engineering" as distinct from "science" degrees are generally held to be unsound in Great Britain is that the practical, which is an essential portion of an engineer's training, can not be rightly regulated or judged by an academic body. A professional body such as the Institution of Civil Engineers is alone competent to co-ordinate the two portions of the professional education.

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43. ENGLISH NEWSPAPERS.

In 1917 there were published in the United Kingdom 2,366 newspapers, distributed as follows: London, 451; provinces, 1,458; Wales, 126; Scotland, 254; Ireland, 186; in the surrounding islands, 17. Of these, 147 were daily papers published in England, 19 in Scotland, 16 in Ireland, eight in Wales, and three in the islands. There are over 60,000 newspapers in the world, and considerably more than half of them are printed in the English language; 13,000 alone belong to the British empire.

Origins.— The beginnings of English journalism can be traced to the so-called «news-letters» of the 16th century — hand-written documents laboriously compiled by literary employes for wealthy and titled personages, statesmen and politicians, who maintained their correspondents at court, in France, Ireland or elsewhere abroad to keep themselves posted on the course of events. The British Museum contains many examples of these news-letters, among them some copies of the *English Mercury,* dated 1588, purporting to give first-hand information about the Spanish Armada. These latter, however, have been proved to be forgeries, executed about 1766. Although printing was introduced in England as early as 1477, the first periodical did not appear till nearly 150 years later. Nothing could be printed except under the jealous eye of a censor appointed by the Crown, and the publication of news was an offense against the State. The vendor or distributor of news was regarded as a miscreant and punished as such. Yet this stringency did not prevent the importation and surreptitious circulation of *corantos, novellas* and *gazets* published in Latin and other languages on the Continent of Europe. In May 1622 the government sanctioned the publication of a weekly periodical dealing with the German (Thirty Years') war. About 1624 it was proposed to issue an official periodical, but nothing was done in the matter till 1665, when the *Oxford Gazette* — afterward renamed the *London Gazette* (official) was founded. That publication has appeared regularly ever since on Tuesday and Friday evenings. In 1642 a variety of publications appeared, but these were not entitled to the name of newspapers. The first real English newspaper, *The Public Intelligencer,* established by Sir Roger L'Estrange, appeared in 1662, and then only at irregular intervals. It lived about three years. In 1680, under Charles II, the printing of newspapers and pamphlets was entirely prohibited, but on the abolition of the press censorship in 1695 regular newspapers sprang into existence. For the next 130 years the history of English journalism is that of a perpetual struggle against heavy and arbitrary imposts, for successive governments retained the powerful weapon of taxation. A stamp duty was imposed in 1711 charging a penny (2 cents) per sheet and a half-penny per half sheet. The duty was raised to three cents per copy in 1776, four cents in 1789, five cents in 1794, seven cents in 1797 and eight cents in 1815. The tax was reduced again to two cents (one penny) in 1836, and entirely abolished in 1855. In addition to the stamp duty, a tax (abolished 1853) had also to be paid on every advertisement which naturally made the newspaper an expensive luxury. The price of the paper rose proportionally with the tax, and during the first half of the 19th century the daily paper cost as much as seven pence (14 cents). Hence newsagents used to hire out papers to different clients at two cents per hour for the first two or three days, and then sell them in the provinces at a reduced rate, by which time the copies were well thumbed and a week old. The paper duty, another impost — on blank paper — was finally repealed in 1861 and the last «tax on knowledge» removed.

The first English daily paper, *The Daily Courant,* appeared in 1702; and the first Sunday papers, *The British Gazette* and *The Daily Monitor* in 1780. The *Dublin Newsletter* (1685) was the first Irish newspaper, and the *Mercurius Criticus* (1651), a reprint of a London *Mercurius,* the first to be printed in Scotland.

Before entering into a description of the English Press as it exists to-day, mention must be made of some of the hardy — even tough — pioneers of English journalism. Their path was not so rosy and remunerative as is that of their successors of the 20th century. They suffered persecutions almost as malicious and cruel as did the religious leaders of the Middle Ages. Those early editors, writers and publishers spent much of their time in prison; yet even vermin-infested cells and low diet, punishments, heavy fines and personal mutilation failed to repress the ardent disciples of the new art of journalism. They served their sentences, paid the fines and stood in the public pillory to be pelted with stale eggs and vegetables. Nevertheless, they continued to abuse profligate kings and princes; they denounced ministers and political jobbery; ventilated the scandals of the aristocracy, misappropriation of public funds, blunders of generals or admirals, and the maladministration of justice. Not infrequently writers on opposition papers turned their weapons of satire and invective against each other. Thus one journal would refer to «our blubber-headed contemporary the . . .»; another to «that squirt of filthy water the *Daily* . . . »; or «that slop-pail of malice and ignorance the *Weekly* . . .» These are verbatim examples quoted in *The Times* of the later 18th and early 19th centuries. But however much they differed on the polemics of the day, they were at all times unanimous in defending the freedom of the press and the right to express their opinions, no matter how distasteful those opinions might be to those in high places. It was considered an essential of good government in those days to suppress all criticism against the rulers of the state. In his ideal community, 'Utopia,' Sir Thomas More (d. 1535) considered such criticism worthy of the death penalty.

Among the early «stars» of English journalism were John Thomas, who was the first to print independent parliamentary news (1641); Samuel Peck, the so-called «Father of the English Press,» who first wrote a «diurnall» of purely English news about 1650; John Dillingham invented the leading article or «editorial,» one of which landed him in prison in 1645; Henry Walker was Cromwell's «special reporter»; he began in business as a hardware dealer, became an ordained minister, was expelled from the church and finished up his career as the most popular and most unscrupulous journalist of his day. Quite a number of black sheep made their way into journalism during the 17th and 18th centuries, men whose chief stock in trade consisted of filth, slander, abuse, blasphemy, unctuous adulation and even incitement to murder. Not a few of them, either from utter lack of principle or force of circumstance, frequently changed their opinions and wrote now for, and then against, any prominent person or public policy. Of such a class was Marchmont Nedham, the last of Cromwell's editors, who was hired at $500 per annum to defend the executioners of Charles I. His *Mercurius Politicus* was founded in 1650 for that purpose; the poet Milton is generally supposed to have contributed to its columns. John

Goodwin, the Nonconformist preacher, described Nedham as "an infamous unclean person, next the hangman." General Monck appointed his brother-in-law, Sir Thomas Clarges, a druggist by trade, to start a party paper. The editor or "author" chosen for this publication was Henry Muddiman, who is described in Pepys' 'Diary' as "a good scholar and an arch rogue." Nevertheless, Muddiman was perhaps the leading journalist of the century in regard to achievement and influence in those stirring times. An excellent account of his life is given in the London *Times* of 10 Sept. 1912. The notorious Titus Oates also employed a band of hireling "scriveners." Other prominent newspaper contributors were Daniel Defoe, the author of 'Robinson Crusoe'; Dean Swift, Bolingbroke, Henry Fielding, Nathaniel Butter, Steele, Addison, Dr. Johnson, etc. To a later period belong Edmund Burke, Cobbett and Wilkes, who combined politics with journalism. It was Burke who made the first attempt to present the history of the world in an annual periodical in the 'Annual Register,' which he founded in 1759, writing the first two or three volumes almost entirely himself. That invaluable work has appeared regularly now for 158 years; it is the property of Messrs. Longmans, Green and Company. A shining example of anonymous English journalism is the collection of articles known as the "Junius Letters" (q.v.), the authorship of which has never been satisfactorily established.

It may be roughly asserted that up to the dawn of the 19th century journalism in England was generally regarded as a more or less disreputable profession; with some few honorable exceptions the writers were either mercenaries or violent partisans, or else had axes of their own to grind. The first real stimulus in England toward an honest, incorruptible press, fearless and outspoken regardless of consequences, was given by *The Times* (London). Near the middle of the 19th century it gradually became more and more a custom for "the better class" of public men and eminent writers to contribute to newspapers, expressing their opinions or publishing reviews. Thackeray reviewed Carlyle's 'French Revolution' in *The Times* (3 Aug. 1837); Disraeli (Lord Beaconsfield) wrote the 'Runymede Letters' anonymously in 1836; Charles Dickens wrote a powerful letter condemning public executions (14 Nov. 1849); Carlyle wrote on Mazzini and some of Tennyson's poems first appeared in the same journal, while Cabinet ministers were not averse from appearing in its columns. In later years, journalism rose to a high dignity in Great Britain. Its disciples have been designated (by Burke) "The Fourth Estate of the Realm," and many have deservedly gained high honors and distinctions. The late Lord Salisbury, Premier and Foreign Secretary, at one time wrote editorials on foreign affairs for *The Standard;* the father of Lord Halsbury, late Lord High Chancellor, was the first editor of that paper; the Rt. Hon. Sir Edward Clarke, K. C., contributed many of the literary reviews for it in the early 60's, while Alfred Austin, the late Poet Laureate, and G. A. Henty, the well-known writer of boys' stories, served on the staff for many years. Sir Frederick Wedmore was the art critic for nearly 40 years and Sir John Foster Fraser its Parliamentary representative. Earl Curzon, former viceroy of India, was once a correspondent of *The Times;* Sir William Russell was its reporter in the Crimean War; Lord Sydenham its military expert; Sir Donald M. Wallace, K.C.I.E., and Sir Valentine Chirol were successively directors of its foreign department. Lord Milner, formerly High Commissioner for South Africa, was assistant editor of *The Pall Mall Gazette* under the late W. T. Stead. The late Lord Glenesk was proprietor of *The Morning Post;* the late Lord Burnham raised *The Daily Telegraph* from a moribund concern to the first rank among London dailies. With other London and provincial editors, journalists and proprietors who have been decorated purely in recognition of their journalistic achievements, the list could be considerably extended. Particularly interesting is the story of the Harmsworth brothers, one of whom is now Lord Northcliffe and the other Lord Rothermere. In 1881 Mr. (afterward Sir) George Newnes founded a penny weekly paper of light reading named *Tit-Bits,* which became an instantaneous success; Mr. Alfred Harmsworth (Lord Northcliffe) followed seven years later with a similar publication, *Answers,* and in 1890 Mr. C. A. (now Sir Arthur) Pearson founded another journal of the same type, *Pearson's Weekly.* All three papers climbed to enormous circulations, stimulated by competitions such as "missing word," "limericks" (afterward pronounced illegal) and guessing the birth rate for London three months in advance. Prizes as high as $5,000 each were offered, in one competition there were so many correct answers that Messrs. Harmsworh added several thousand dollars to enable each winner to collect 10 shillings and six-pence ($2.50). Sir George Newnes built up a great publishing business confining itself to books and magazines. In 1896 Mr. Harmsworth founded *The Daily Mail,* a one-cent paper which now claims a circulation of over a million copies per day; Mr. Pearson followed in 1900 with the one-cent *Daily Express,* which also quickly found an enormous circle of readers. In 1904 Mr. Pearson acquired *The Standard* and its adjunct *The Evening Standard* for $1,500,000; the former paper ceased publication in 1916, a victim of the war; and the latter has passed into other hands. In 1908, as the result of a lawsuit brought by one of the shareholders, *The Times* was formed into a limited company and Lord Northcliffe secured a controlling interest. Among the proprietors of that famous paper are numerous descendants and relatives of the original founder, John Walter; the fifth in line of succession, John Walter the fourth, son of the last chief proprietor, Arthur Fraser Walter (d. 1910), is chairman of The Times Publishing Company. Sir Arthur Pearson, who had suffered for years with an affliction of the eyes, is now blind; he has retired from journalism and dedicates his energies to ameliorating the condition of soldiers who lost their sight in the European War. *The Times* is the second oldest London newspaper. It is regarded — in England at least — as "the greatest paper in the world." Certainly no journal has a more romantic history behind it, or exerted a more world-wide influence. Founded in 1785 as *The Universal Daily Register* by John Walter, a prosperous coal merchant, its title was changed in 1788 to *The Times*. For a libel on the Duke of York, Walter was fined, imprisoned and condemned to stand in the pillory (1789). Under John Walter 2d (1776–1847) the paper rose to the great eminence it has since enjoyed. Originally printed "logographically" from wooden blocks, *The Times* was the first newspaper to be printed by steam, in 1814. During the Napoleonic wars John Walter established his own system of continental couriers and had his own sailing vessels to convey dispatches across the Channel. He had the first "special correspondent" at Tilsit in 1807, and sent the first war correspondent, Henry Crabb Robinson, to the Peninsular War in 1808. Proprietor, editor and business manager combined, Walter was fearless of authority, incorruptible and entirely indifferent to profit or loss; he instilled a wholesome respect for his journal among the ruling classes, not only in England, but throughout Europe. The oldest daily in London is the *Morning Post* (1772), which, with the *Daily Telegraph* (1855) runs the leading paper close in excellence of style and lavish expenditure on foreign news. The *Daily News* (1846) and the *Daily Chronicle* (1855) were reduced from a penny to a half-penny in 1904, and are widely read by the working classes. In 1906 Mr. Franklin Thomasson, M.P., started *The Tribune*, a magnificent production (daily) which only existed two years, after $2,000,000 had been sunk in the venture. The evening press of London consists of the Conservative *Pall Mall Gazette* — formerly the property of Mr. W. W. (now Lord) Astor, of New York; the *Evening Standard*, the *Globe* (1803), *Evening News*, the Liberal *Westminster Gazette* and the *Star*. Nearly all of them are published in or close to Fleet street, perhaps the most interesting and romantic thoroughfare in the world. Though just over a quarter of a mile long, it contains offices of all the important papers of the empire, of the United States, China, India, Siam, Russia, Germany, France, etc. Fleet street is haunted by memories of many writers; its history is a history of the personalities of English literature. Not only Dr. Johnson, Oliver Goldsmith, Charles Lamb, Izaac Walton and Alexander Pope frequented its old "coffee houses," but "the ghosts of most of our literary men, famous and unknown, are to be found there." The great Delane of the *Times* lived there; Charles Dickens edited the *Daily News;* Edmund Yates *The World*, Sir Edwin Arnold the *Daily Telegraph*, Henry Labouchere conducted *Truth*, Sir F. C. Burnand and now Sir Owen Seaman *Punch*, W. T. Stead ran *The Review of Reviews* and *The Pall Mall*, Justin McCarthy the *Morning Star*, to say nothing of the host of anonymous writers, artists, critics and literary adventurers. The fascination of Fleet street is irresistible; it is strewn with the wreckage of unachieved ambitions and has provided fortunes and fame for the successful minority. It is a tradition that once Fleet street is entered by the predestined journalist, it quickly grips him body and soul, and nothing will shake his faith that success does not await him around the next corner. London is rich in Sunday and weekly papers. Of the former, the most prominent are the *Observer, Sunday Times* (no connection with the other paper of that name); *News of the World, Lloyd's Weekly* (enormous circulation throughout the British empire); *Weekly Dispatch, The Referee* and *The People*. The more sedate weeklies are the *Spectator*, the *Saturday Review*, the *Athenæum*, the *Academy*, and the *British Weekly;* the *Illustrated London News* and the *Graphic* have a world-wide reputation as old established and high-class journals; the *Era* is devoted to the theatrical and musical professions, the *Lancet* to medicine and surgery; *Vanity Fair* to social affairs, literature, sport, etc., and the great humorist, *Punch*, is too well known to need description. *Notes and Queries* (established 1849) is one of the most interesting journals for scholars; the *Sphere*, the *Queen*, the *Tatler* and the *Bystander* are also excellent illustrated papers (weekly); *John Bull* is a penny weekly of a strong radical type. The sporting fraternity is catered for by the daily *Sportsman* and *Sporting Life;* the liquor interests are upheld by the *Morning Advertiser*, while *Truth* devotes its energies to exposing frauds; it has fought more libel actions than any other paper in existence, and has won most of them.

The provincial press of Great Britain numbers many influential organs, foremost among them being the *Mancheser Guardian*, the *Liverpool Post, Birmingham Post, Newcastle Daily Chronicle*, the *Scotsman, Freeman's Journal* (Ireland), etc. They have enormous circulations and cover wide districts, besides which all the London papers are rushed to every part of the United Kingdom by special trains each morning. It is only during recent years that British journalism has dropped the veil of anonymity which hid the identity of writers. In many cases, of course, it was well known who wrote certain articles on certain papers. Thus all the world knew that the *Times* representative in Paris was the great Blowitz; that "Dagonet" of the *Referee* was — and still is — George R. Sims, that "Toby, M. P.," was Sir Henry Lucy, etc. In one particular respect the British Press differs considerably from the American. No British paper — or contributor — would ever think of copyrighting small, amusing trifles or "specials" regularly written under a real or assumed name. One very rarely sees anything marked "copyright" in the British press; it would have to be something very important indeed to deserve that distinction, or have been written by some great personage, in which case (Kipling frequently) it is marked, "Copyright in the United States."

It can be said without fear of contradiction that British journalism is on the whole the purest institution of its kind in existence. Its devotees with very few exceptions aim to find out the true state of facts, to report them with fidelity, to apply to them strict and fixed principles of justice, humanity and law; to inform, as far as possible, the very conscience of the nations, and to call down the judgment of the world on what is false, or base, or tyrannical.

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44. THE TREND OF THOUGHT AND LITERATURE IN THE 19TH CENTURY.

General Characteristics.—An almost unprecedented development or expansion of intellectual energy characterized the opening years of the 19th century in Great Britain. The emancipating influences, which had produced the French Revolution, were then working in England at their acme of strength, and were generating an intellectual as well as a political and social reformation, which steadily gathered force as the century grew older. The new tide of thought found at the outset its loftiest manifestation in purely imaginative literature. The mighty revival of imaginative literature, amid which the century opened, is only comparable with that of the age of Shakespeare. The highest intellectual energy of the nation seemed to find, at the beginning of the epoch, its complete and most congenial expression in the departments of poetry and fiction. Between the years 1800 and 1825 the works of Wordsworth, Shelley, Byron, Coleridge, Keats, Jane Austen and Sir Walter Scott were the chief triumphs of the intellectual movement which was clarifying man's mental vision and remodeling his aspirations.

After the first quarter of the century the creative literary activity of England showed some signs of exhaustion. But the ebbing was then of short duration. The tide of intellectual energy in the sphere of literary endeavor quickly rose again. The torch that had been lighted by Wordsworth and Shelley, Byron and Scott, Lamb and Coleridge, soon flamed anew in the hands of Tennyson and Browning, of Dickens and Thackeray, of Macaulay and Carlyle, of Ruskin and Matthew Arnold.

With the sixth decade of the century, a radical change came over the intellectual horizon of the nation. The intellectual spirit no longer contributed the whole of its richest sustenance to the field of great imaginative writing. It long continued to nourish splendid imaginative effort; only when the century closed did the purely imaginative energy, which had flowed on almost continuously from the first, grow sluggish and tame. But midway through the century the intellectual spirit proved fertile enough to produce in new glory and luxuriance a second and a very different type of intellectual fruit. During the last five decades, the intellectual spirit gave a fresh and unexampled impetus to scientific inquiry and to speculation concerning the character and capacity of all animate and inanimate nature. For a generation the poets and novelists, the critics and historians, divided the honors of intellectual exertion with scientific investigators like Darwin, Wallace, Huxley and Tyndall, and with philosophers like John Stuart Mill, Herbert Spencer, Thomas Hill Green and Leslie Stephen.

When the century was reaching its end, the spirit of scientific inquiry was producing no triumphs so heroic as those associated in the middle years with the names of Darwin and his disciples. But scientific energy was at the close of the epoch still giving notable proofs of activity, while literary energy was comparatively torpid. In the last half of the period science and pure literature may fairly be credited with having slowly changed their relative places in the empire of the British intellect. Pure literature which held the place of predominance at the beginning of the era yielded it to science before the end. The mass of available intellectual energy which had gone at the outset to the making of poetry and fiction, of history and criticism, was ultimately diverted to the cause of science. In general terms, the gradual and peaceable succession of science to the throne which had been occupied by imaginative literature may be said to mark the trend of British thought and literature in the 19th century.

Homogeneity of the Imaginative Effort.—For the purpose of detailed study of the literature of the century it might be convenient to divide it into four chronological sections — each corresponding with one quarter of the period. But there is an essential homogeneity about the whole of the century's literary effort, which renders chronological division undesirable in a brief survey. Specious grounds may be urged for separating the century, in however rapid a general view of its thought and literature, into at least two periods, the one ending and the other beginning at the accession of Queen Victoria in 1837. In 1837 the literary giants of the opening years of the century either were dead or had ceased to write. Among poets, Byron (1788–1824), Shelley (1792–1822), and Keats (1795–1821) had passed away. Wordsworth (1770–1850) had ceased to be a poetic force, save in the sight of admirers more zealous than discreet. Of writers of fiction, Jane Austen had been dead 20 years and Sir Walter Scott five. Among essayists whose work conferred on the literature of the century one of its most distinctive charms, Charles Lamb, the genial king among such literary artificers, did not survive beyond 1834; Hazlitt died in 1830, and although De Quincey and Leigh Hunt lived more than 20 years longer, their best work was done in the pre-Victorian epoch.

But there is no genuine philosophic ground for detaching the work of these heroes from that of their successors. The writers of eminence, who have exclusive right to the epithet Nineteenth Century or Victorian, prove after allowance has been made for individual idiosyncrasies which in great literature count for much, to belong in spirit to the age of their immediate predecessors. They sought expression for their thought in forms not essentially different from those to which their predecessors devoted energies, and their thought showed no new departure. It still breathed that faith in the dignity of mankind, in its inalienable right of rational liberty and in the greatness of the human destiny which was the outcome of the French Revolutionary spirit, at the same time as it paid respectful homage to surviving tradition of the great art and literature of a more distant past.

Tennyson (1809–92) who shares with Robert Browning (1812–89) the first place in the poetry of Victorian England, is nearly at all points Wordsworth's successor. Like Wordsworth he was in sympathy, through his prime, with the political and philosophic enlightenment of his era. It was this which he sought to interpret in his verse. He was a careful observer and a sympathetic expositor of inanimate nature. He had Wordsworth's command of poetic diction and melody, and also, it is to be admitted, Wordsworth's tendency to bathos and commonplace, in spite of his keen ear and sense of form. Browning — the twin-peak with Tennyson in the range of Victorian poetry — presents a stronger individuality. He is less closely allied to the writers who flourished in his early youth. But in many of his most striking characteristics,—in the subtlety of his power of psychological analysis, in his robust optimism, in the universality and activity of his interest in current life and literature, in his predilection for study of past history and biography, and even in his indifference to the graces of form which degenerated with him at times into a barbarous grotesqueness — in one or other of these regards Browning betrayed kinship with Coleridge, Byron, Landor and Scott.

Third in the list of those Victorian writers of the imagination, whose lives wholly belonged to the 19th century, stands Matthew Arnold (1822–88). As a poet Arnold marched under the banners of Wordsworth and Shelley; as a critic in prose he was at some points more subtle and less sympathetic, and at other points clearer-eyed and less prejudiced than Lamb or Hazlitt. But the distinctions between Arnold and the earlier essayists of the century are due not so much to difference of epoch or of innate temperament. They are attributable rather to the idiosyncrasies that come of accidental divergences in youthful training and environment. Arnold's native heritage of genius bore an academic impress owing to his association with Rugby, a great public school of which his father was a distinguished headmaster, and with Oxford, the University whose traditions and temper he permanently assimiliated as a young man. Had Lamb and Hazlitt enjoyed Arnold's youthful experiences, their style and sentiment are likely to have worn Arnold's colors. They were at one with each other in their ultimate conception that the æsthetic sense was the sense best worth developing in human life and thought.

The three poets whose genius first blossomed midway through Queen Victoria's reign, Dante Gabriel Rossetti (1828–82), William Morris (1834–96) and Algernon Charles Swinburne (b. 1837), all to some extent inherited and developed the tradition of Keats. Rossetti and Morris were painters as well as poets. The former was a leader of the pre-Raphaelite movement, which sought to reproduce in art the simple beauty which distinguished pictorial effort of the early Middle Ages. As poets, Rossetti and his friend Morris sought their affinity in the sphere of mediæval romance, whence both Keats and Sir Walter Scott had drawn with differing motives much inspiration. Rossetti was almost as great a master of the sonnet as his teachers Wordsworth and Keats, and he and Swinburne improved on Keats's and Tennyson's aptitude to suggest in metre new and subtle harmonies of music. Swinburne, at the opening of his career, seemed to graft on the sensuous influences of Keats the voluptuous temper of Byron. He cherished the wild aspirations which were bred of the French Revolution. The poetry of Swinburne's youth ranks among the century's literary glories. He alone of his poetic school still survives. But his late work has hardly sustained the promise of his rebellious early years. The unimaginative spirit of the second half of the century would seem to have discouraged and repressed his poetic development.

The seventh great master of Victorian literature, whose work in spite of the varied aim may best be classed with literary products of the imagination, was John Ruskin (1819–1900), who in that field survived all masters of his generation, save Swinburne. Ruskin has, like Rossetti and his friends, some claim to be numbered with the disciples of Keats. He devoted himself to expounding an æsthetic philosophy, the germ of which is discernible in Keats's poetry. He gave a very wide interpretation to the attributes of beauty, which he identified with excellence in every kind of human endeavor. In his voluminous writings he sought to define the place that beauty and its manifestation in art ought to fill in human economy. His clarity of style, imaginative insight, and assertive personality invested all his literary work with fascination. But he owes his chief importance in the history of the 19th century thought and literature to his masterly interpretation, analysis and application of the æsthetic principles which underlie the most characteristic achievements of the great writers belonging to the generation that preceded or was coincident with the date of his own birth.

Fiction and Drama.— In fiction it might appear as if the spirit which colored manifestations in the early years of the century perished before the later or even the middle years were reached. The centre of gravity may seem at any rate to have shifted somewhat violently between the dates of 'Sense and Sensibility,' 'Waverly' and 'Vivian Grey' on the one hand, and of 'David Copperfield,' 'Adam Bede' or 'Vanity Fair' on the other. Still wider may seem the interval between 'Romola,' 'Esmond,' and 'Barnaby Rudge,' and 'Harry Richmond,' 'Jude the Obscure,' and 'Dr. Jekyll and Mr. Hyde.' But all the masterly fiction of the century aims, through different avenues, at a like goal. It seeks the exact, the vivid, the sympathetic and for the most part the optimistic representation in narrative of the complexities and perplexities of human life and feeling. Whether the novelist rear his structure on historical research or on autobiographical experience, on careful observation of contemporary society, or on imaginative speculation into human potentialties, his success is due to his power of combining in his chronicle artistic presentment of facts of experience with sane and practical interpretation of thought and impulse.

None of the great novelists of the 19th century failed at one or other period of their careers to emulate Sir Walter Scott's method of seeking in history material through which to work out their ambitions. Scott concentrated on the historical novel a mass of learning and a wealth of intuition which no successor inherited. But the spirit which animated his achievements in the art of fiction lived, albeit in attenuated condition, in the labors of Charles Dickens (1812–70) and William Makepeace Thackeray (1811–63), of George Eliot (1819–80) and Robert Louis Stevenson (1850–94). Thackeray reached the highest point of his career as an artist in fiction when he produced 'Esmond,' a story of the time of Queen Anne. Dickens in 'The Tale of Two Cities' and in 'Barnaby Rudge' brought all the vigor of his genius to vivify historic episodes of the century preceding his own. George Eliot proved herself more scholarly and more laborious, and therefore less successful than Dickens or Thackeray, when she sought in Romola to evolve a romance out of the history of the Florentine reformation. Robert Louis Stevenson, master of the most picturesque style among novelists since Laurence Sterne, made his most sustained bid for reputation by pursuing in the chronicles of Scotland the historical trail. The same category embraces the most notable work of lesser luminaries like Bulwer-Lytton, Charles Kingsley and Charles Reade, with each of whose names an historical novel of eminence has to be associated.

Not that the novel of current experience failed to flourish in increasing luxuriance as the years of the century grew. The cultivation of fiction which reflected the foibles and aspirations of contemporary society, absorbed throughout the epoch literary genius of the most varied and conflicting types. The most conspicuous laborers in this field of endeavor were, during the early years, Jane Austen and Disraeli, while their successors included Charlotte Brontë, Dickens, Thackeray, Trollope and Charles Reade during the middle years of the century and George Meredith and Thomas Hardy during the last years. The century's yield of fiction in all its forms far exceeded in quality and quantity that of any earlier epoch. The stream was continuously replenished and it maintained till near the end a level approximating to that of the first days. But even in fiction the creative energy failed to intensity as the epoch closed.

The drama was the only field of imaginative literature in which England of the 19th century failed to secure conspicuous and lasting triumphs. The standard of excellence which Shakespeare set in the 16th and early 17th centuries was not likely to be reached again. But the dramatic productions of the 19th century proved of smaller value than the efforts of the 17th or 18th century, which, despite their inferiority to Shakespearean drama, maintained a level of permanent interest. No writer of comedy in the 19th century is comparable with Sheridan, not any writer of tragedies with Dryden or Otway. Writers like Browning and Swinburne, who devoted poetic genius to tragic or romantic drama, never acquired mastery of the true dramatic temper which belongs to the art of the theatre. They proved themselves capable of fine poetic declamation and were skilled in the use of poetic language, but their efforts resulted in the production of dramatic literature for the study rather than of drama for the stage. Bulwer-Lytton, Sheridan Knowles, Tom Taylor and T. W. Robertson are the only English playwrights of the early or central years of the 19th century any portion of whose work lived after its original production in the theatre. Taylor and Knowles essayed romantic drama. Lytton and the rest won their chief fame in the comedy of manners. But immortality was denied them. None of these men courted with any effect the muse of tragedy. Such plays of theirs in the vein of comedy or romance as retained their vogue in a succeeding generation quickly lost the savor of freshness and seemed to breathe in a very short space of time an antiquated or a faded atmosphere. Their fame soon flickered. A chief cause of the failure of drama to attract during the 19th century any substantial or efficient part of the literary genius of the era doubtless lay in the competing claims of the novel. The growing complexity of life and thought rendered it increasingly difficult to give, in the brief and graphic terms of drama, permanently satisfying expression to the complexity of current aspiration and speculation. The art of fiction is freer of conventional restrictions than dramatic art, and gives fuller scope to endeavor, which seeks to interpret variegated experience and manifold human effort.

Carlyle and Macaulay.— The 18th century not only won its literary triumphs by virtue of the exercise of the imagination in poetry and romance. Throughout the century history and criticism, in which the imagination plays a more limited part, were flourishing conspicuously. Henry Hallam (1777–1859) produced between 1818 and 1837 three solid historical works, which anticipated many of the characteristics of the new historical school in England. They were for the most part genuine studies of original authorities and although they betrayed a whig political bias were conscientious endeavors to present the facts fairly. A robust commonsense atoned for the lack of sympathetic imagination or broad philosophical temper. But Hallam's labors stand apart and lay for the most part outside the main contemporary currents of intellectual effort. The two representative practicers of the arts of history and criticism in the 19th century—Carlyle and Macaulay—were possessed of far greater literary genius than Hallam and exerted a wider influence. Both were long lived. Their work was well begun before Queen Victoria commenced to reign; it continued long after. Carlyle was born five years before the end of the 18th century and died in 1881. Macaulay was born in the first year of the last century and died in 1859.

Carlyle is one of the most distinctive figures in the whole range of literary activity in the 19th century with which his life was almost coterminous. He was thoroughly imbued with the large ideas of man's social perfectibility to which the leaders of the French Revolution gave expression in their cry for liberty and fraternity. But he was at the same time a potent and censorious foe of many of the social tendencies which the French Revolution set in motion. He warned his contemporaries of the dangers inseparable from the leveling spirit of a democratic age, with a greater practical effect than any man of letters has compassed before by dint of mere passive penmanship. To Carlyle's essays and lectures may in part be attributed that definite recognition of the limitations inherent in a purely democratic ideal, to which, in the earlier decades of the century, the eyes of the mass of Englishmen seemed closed.

Carlyle's finest literary work was done in the fields of history. He toiled complainingly in the dry-as-dust repositories of historical learning, but he did not take so wide a view of the historian's fiction as the greatest of the British historians, Gibbon, nor were his researches so exhaustive or so multifarious as the more recent scientific standard of historical investigation prescribes. But by force of a rare imaginative insight into human action and character, Carlyle recalled to life a series of episodes of the past, with a truth and realism which no poet or novelist, working with unlimited right and power of invention, has excelled in pith and moment. Carlyle's 'French Revolution' (1837) and portions of his 'Frederick the Great' (1858-65) set before the reader historic episodes with something of the dramatic intensity of the historical plays of Shakespeare.

At the same time as Carlyle was working out his destiny, Macaulay was also making masterly contributions, of not altogether dissimilar calibre, to the literature of the century. Macaulay's knowledge of books and records was as great as Carlyle's, if not greater, but his historical achievement remains on a lower plane. He possessed far less imaginative intuition. His mental horizon was limited by temporary conditions of current political conflict. His conception of historic fact was colored by partisan prepossessions, which, viewed in relation to the great destinies of the human race, seem puny, and in a historian, tend to unveracity. Carlyle and even Gibbon had strong prejudices, but their native sentiment was cast in a larger mold. Their preconceptions left the historical spirit in the main unclouded.

In style Carlyle and Macaulay were as the poles asunder. The spasmodic irregularity of the one has nothing in common with the disciplined orderliness of the other. Macaulay's influence on the English prose style of the century has been far greater and on the whole more beneficial than Carlyle's. Carlyle's style was a bow of Ulysses, which none but himself could bend. In other hands it became an implement of burlesque. Macaulay's style which was less impracticable, inherited and developed many of the best features of the prose of the 18th century. It was mainly characterized by a directness and an emphasis which often grew into brilliant and stirring eloquence, although it inclined at times to monotonous rigidity, and at times to declamatory violence. It proved a dangerous style for purposes of servile imitation. The habit of insistent emphasis is apt to degenerate among the incompetent into bombast. At the same time the discreet and intelligent assimilation of Macaulay's prose tends to clearness and point without appreciable sacrifice of grace. Toward the end of the century a passing reaction set in against the metallic clearness of Macaulay's diction, and efforts were made to invest English prose with a subtle elegance and cloudy preciosity to which it was not naturally adapted. The most remarkable at such filigree workers in prose was Walter Pater (1839-94). Another conscious artist in prose was Robert Louis Stevenson but he was endowed with a fertile imaginative power which preserved his style from the vices of pedantry and kept its lucidity intact. Pater devoted himself to æsthetic criticism which he clothed in a delicate and ornate verbal garb. Pater often achieved beautiful effects. But the methods were inseparable from affectations and conceits, which often render his prose difficult to read with understanding. The irresistible vogue of Macaulay's prose style ordained that none should be widely acceptable which failed at any point in perspicuity. John Ruskin, whose æsthetic criticism covered a wider field than Pater's, proved, too, that perspicuity in English prose was not incompatible with artistic beauty and pliancy. Affected prose consequently met with small encouragement; it was cherished by coteries and did not color the broad currents of the century's literature.

The Scientific Tendency.— The trend of English literature and thought was profoundly affected by the scientific and philosophic spirit of inquiry which received a triumphant impulse from the publication of Charles Darwin's 'Origin of Species by Means of Natural Selection' in 1859, and from the inception of Herbert Spencer's 'System of Synthetic Philosophy,' in 1862. The earlier literary work of the utilitarians, Jeremy Bentham (1748-1832), David Ricardo (1772-1823), James Mill (1773-1836), and above all, John Stuart Mill (1806-73), only indirectly touched the imaginative temper of the times. The topics which the utilitarians handled were practical matters of social and political reform, some of which had been suggested by the French Revolutionary movement. The larger conceptions of man's physical or spiritual destiny were for the most part overlooked. The statute book of the realm between 1840 and 1874 reflected the economic principles which the Mills and their disciples disseminated, but neither the great poetry nor indeed the great fiction, bore, in any appreciable degree, trace of the reforming activities or enthusiasm of the utilitarians. Dickens occasionally expanded in his novels the practical suggestions of the utilitarians, but it was elsewhere, it was in the literary presentation of universal features of human nature, that he rendered his most memorable service to literature. The scientific and philosophic movement gathered its greatest force in the years which followed the revelations of Darwin and Spencer. Then at length the scientific spirit spread to the nation's literature and affected the matter as well as the manner. On prose style it exerted an immediate influence. It insisted with a greater force than Macaulay's example commanded on perspicuity as the main virtue of expression, and effectually discountenanced whatever was subtle, obscure or deliberately affected. One scientific writer, Thomas Henry Huxley, who championed and developed the Darwinian doctrine, lived on till 1895. Huxley was gifted with an exceptional clarity of thought and expression, and his range of interest in current affairs secured for his writings a wide general audience. Huxley's labors may be regarded as an efficient agent in the national development of plain-speaking prose.

As far as the new scientific spirit affected pure literature, it may be said to have exerted a hampering effect on imaginative effort. Both George Eliot and Tennyson in their later work showed proclivities to philosophic or scientific speculation, which encumbered their imaginative deliverances with scientific terminology. Till the end of the epoch scientific or philosophic speculation inclined to divide the allegiance of men who were endowed with poetic genius and to dissipate their energies. William Morris, whose poetic gifts enabled him to conquer rich fields of pure romance, devoted most of his energy of his late life to developing theories of social regeneration which had their root in current scientific and philosophic inquiry.

Not that the scientific tendencies of the century went forward without check. Religion at times called literature to her aid in order to rally her forces for conflict with science. A specially vigorous attempt was made in religious circles by the Oxford movement, of which John Henry Newman (1801–90) was the chief literary leader, to stem at the outset the tide of the scientific advance. Newman was a great man of letters whose imaginative powers were combined with great delicacy of style in both poetry and prose. He made contributions of lasting value to the literature of the century. But his reactionary efforts failed to restrain the scientific and philosophic impulse of his era, if they did not by their open definance of scientific progress consolidate the champions of free scientific speculation, and accelerate their victorious march. An endeavor to effect, on more pacific lines, a compromise between the opposing forces of science and of the imaginative sentiment of religion was made by leaders of another school of thought which was known as the Broad-Church. That school of thought had no greater sympathy with Newman's unbending conservatism than with the revolutionary independence of scientific and philosophic inquiry. The Broad-Church leaders, Frederick D. Maurice and Charles Kingsley, were ready and voluminous writers. But their theological or philosophic position was logically unsound, and they failed permanently to affect the trend of contemporary thought, which finally accepted the scientific sway beyond risk of relapse.

It was in the field of history, of all departments of literature, that the scientific spirit most resolutely planted its standard. Workers in history grew in number as the century closed. But only one English historian of the period deliberately persisted in the literary tradition, which Carlyle and Macaulay had dignified. James Anthony Froude, who died in 1894, alone practised history as a branch of great literature. In his historical work he gave free play to a natural gift of style and a sense of the picturesque. He treated accuracy of detail or judicial impartiality as comparatively of small account. For the time being, Froude is the last representative of the great literary school of historians.

It was in the middle of the century that the scientific spirit invaded the province of history and developed a new view of its aims. Facts were to be accumulated and arranged so as to illustrate and explain the evolution of civilized progress. The scientific method of historical inquiry was first put in practise by Henry Thomas Buckle (1821–62), whose unfinished 'History of Civilization' excited great public interest. The first volume appeared in 1857, the second and last in 1861.

The substantive value of Buckle's labors proved less than he or his admirers anticipated. The field of observation, which he sought to survey, proved too wide for any one man's capacity. His method depended for its success on mastery of minute detail touching every department of human endeavor. The quest of omniscience proved fatal. Many of the generalizations, in which Buckle's scheme compelled him to take refuge, were either disputable or were confuted by more specialized research. But though Buckle's historical work failed long to sustain its authority, its influence was permanent. It encouraged the application of scientific method to historical investigation. It raised the standard of historical accuracy. It promoted specialized research. It encouraged concentration of industry in narrow fields of historical inquiry.

Six men, Seeley (1834–95), Lecky (1838–1903), Freeman (1823–92), Stubbs (1825–1901), Creighton (1843–1901), and Gardiner (1829–1902), were the most conspicuous representatives of the tendency to pursue in history the methods of scientific accuracy. The order in which the names are placed here indicates the progressive ascendancy of specialization in historical research. The six men's modes of work differed in detail among themselves. Seeley and Lecky sought to graft a broad philosophic tone on their historical investigations. Freeman, Stubbs, Creighton and Gardiner rarely suffered their minds to stray from their endeavors to accumulate and to test the facts which illustrated the evolution of politics or political institutions. As a consequence the writings of Seeley and Lecky assimilated a finer literary spirit than those of their associates. While the permanent value of the scientific treatment of history is now admitted, there is risk of repelling students by too severe a presentation of the results of research, and it may be that the new method stands in need of a greater infusion of literary art before its credentials will be accepted universally. Gardiner, the latest of the 19th century historians to pass away (d. 23 Feb. 1902), labored with rare self-denial within a narrow range of English political history, the early and middle years of the 17th century. He made small endeavor to cultivate the literary graces.

Another indication of the progress of scientific method in the province of literature is found in the energy which has of late years been applied to textual criticism of standard authors and to the publication of historic documents. The British government has undertaken the issue of state papers, of the muniments of great families and of official records. Private voluntary societies have co-operated in such endeavors, and with their aid local archæology has especially been investigated with an unexampled thoroughness. Other private literary societies, like the Early English Text Society, and numerous private publishing firms, following the examples set by the presses of the great universities of Oxford and Cambridge, have placed at the disposal of the public, accurate texts of the great literary monuments of the country. In undertakings like the Dictionary of National Biography and the Oxford English Dictionary, efforts have been made to co-ordinate and codify on a large scale the hitherto scattered fruits of historical, literary and philological research. All these enterprises are tributes to the ascendancy of scientific method. They bear testimony to the trend of 19th century thought and literature, which shows during the last half, decay of the purely imaginative impulse, and advance of the purely scientific. But there is nothing in the nature of the present situation to preclude the revival in due time of such imaginative energy, as distinguished the first half of the century. Scientific and imaginative achievements are complementary fruits of the intellect. They need not be mutually exclusive. The future is likely to bring to light an accommodation of their respective pretensions to mastery in the realms of thought. There is small reason why science and pure literature should not flourish in perfect development side by side.

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45. THE BRITISH NAVY. Over a thousand years ago Alfred the Great fought and blockaded the Danes with his fleet of rowing boats. A thousand years later found Great Britain still the undisputed mistress of the seas, fighting and blockading the greatest military and the second strongest naval power on earth. It is a far cry from the wooden galleys of Alfred to the huge, steel and iron floating fortresses of the 20th century. Throughout all their innumerable wars, the British people have never had the truth of Tennyson's ringing words more forcibly brought home to them that «the fleet of England is her all-in-all,» than in the gigantic struggle that broke out in 1914. If one were to ask the question, «What is the *cause* of the British Navy?» the answer could be given in one word — «geography.» The lives of nations, like those of individuals, are governed rather by accidental circumstances than by design. The accident of her geographical position dictated that England must either become a maritime power of the first rank or remain the appanage of some other European state. There could be no alternative between these two extremes beyond, perhaps, a political status similar to that of Holland or of Belgium — an independent existence on sufferance «guaranteed» by stronger neighbors and liable to revocation. In so far as the British people had any opinion on the matter, it was well expressed by the poet Thomson in 1740:

> When Britain first at Heaven's command
>   Arose from out the azure main,
> This was the charter of her land,
>   And guardian angels sung the strain:
> Rule, Britannia! Britannia rules the waves!
>   Britons never shall be slaves.

In 56 B.C. Cæsar prepared the way for his invasion of Britain by leading an expedition to the estuary of the Loire, where he destroyed a great fleet massed by the Veneti to oppose his progress, and included in that fleet was a British contingent. In the third century of our era the Roman emperor Maximianus sent General Carausius to defend the coasts of Britain against the activities of Scandinavian pirates. For that purpose he was provided with a fleet and invested with the title of «Count of the Saxon shore in Britain.» But Carausius was a pirate himself. He attacked the sea-rovers, appropriated their plunder, and wound up by appointing himself Emperor of Britain. His imperial status was acknowledged by Rome after he had defeated the Roman fleet that was sent to chastise him. He ruled the country well for seven years when he was murdered in 293 A.D. He made Britain an independent state and incidentally became the «father of the British Navy.» Some 600 years later King Alfred created an organized personnel and built vessels that were longer, higher and swifter than any others. The Saxon king Edgar (958–975) possessed a considerable naval force divided into three squadrons stationed in the North Sea, the Irish Channel and off the north coast of Scotland. The warships of that time differed entirely from merchantmen in type of construction, but as the art of sailing developed, the two became interchangeable. All the seas then traversed being infested with pirates, it was necessary for every merchant vessel to be armed and its crews trained to fight. These ships formed a vast reserve to the standing naval forces. William the Conqueror granted certain privileges to the Cinque Ports (q.v.) on condition that they agreed to provide a specific number of manned and armed vessels whenever needed. King John had some vessels of his own in addition to the feudal squadrons, but it took many years before a real national or «Royal» navy was created. Henry VII, who reigned from 1485 to 1509, founded the national dockyards at Portsmouth and Woolwich and also built the first «two-decker» in the British fleet, the *Henri Grace à Dieu*.

A court jester once remarked that it was better for a country to be ruled by a queen than by a king, for in the latter case the influence of women would prevail, whereas in the former the ascendancy of men was sure to make itself felt. Queen Elizabeth illustrated this maxim in a way never contemplated by the humorist, for it was in her reign that the foundations of England's maritime greatness and of her world-wide empire were laid. When she ascended the throne England had not a single possession outside of Europe. The English navy was small and inefficient; considered apart from privately owned ships the Royal Navy can hardly be said to have existed at all. England was not then «a nation of shopkeepers,» but a nation of fishermen. During Plantagenet times England was no mistress of the seas, hardly even a maritime state. Occasionally we find Mediæval England in wartimes possessing a considerable fleet, which always dwindled away again when peace came. This decay of the navy frequently recurred. Then, when a new war broke out, the government would issue a general license to all merchant ships to act as privateers, and those ships responded by becoming pirates. Henry VIII laid the foundation of the modern Admiralty by creating the «Navy Office.» His navy at first consisted of but one ship — the *Great Harry* — a gaudy conception that resembled a floating circus. At his death he bequeathed a fleet of 12,500 tons to his successor. The Spanish navy, however, was at that time the finest in the world, for it owed its importance to the discoveries in America and was kept in an efficient state in order to guard those recently acquired possessions in the west. Religion and America were the great causes of enmity between England and Spain. Philip II of Spain was actuated by a double policy — to crush the new-born Protestantism and to keep the newly discovered continent across the Atlantic for Spain. In fact, until the Reformation Spain and Portugal had practically divided the New World between them. «Never since the Norman conquest had England counted so small a territory, never were her fortunes at so low an ebb as when, in the year 1558, the last of the Tudors assumed the reins of power.» Elizabeth found able assistants in the mariners of Devon and Cornwall, who were always ready for adventure and not over scrupulous whether that spirit was satisfied by voyages of legitimate commerce or by the exploits of illegitimate piracy. But whether genuine traders or bold buccaneers, there is no doubt that they were mariners who had no rivals in seamanship. After the Reformation, which was carried out in the spirit and according to the methods of those times, a terrific energy began to seize the English people. It seemed as though the way across the ocean had suddenly been opened in all directions to English ships. The discovery of America and the West Indies had opened up new opportunities for exploration and trade. Three nations grasped the opportunity — first Spain, then Portugal, then Holland: England came last. Spain and Portugal had over 150 years' start of Great Britain, while both Holland and France were well in advance of her. But when that country did enter the lists, it was not only «Westward Ho!» that the British flag was carried at the masthead. British ships attempted the northeast and northwest passages; they sailed the Mediterranean — where English ships had not been seen since the Crusades. They sailed to America and discovered the coasts and creeks of the North; they sailed round the cape to India and China; they attacked the Spaniard wherever they found him; they plundered his towns and took his ships. Commercial enterprise, combined with a love for adventure and the driving force of political necessity, led the hardy seamen of Elizabeth to the remotest corners of the world. They cultivated a creed they called the «Idolatry of Neptune.» Since those «spacious days» the British navy runs like a continuous thread through almost every event in British history; in every great crisis it appears as the dominant and decisive factor. These early voyages gave the English sailors a mastery in the art of navigation and a contempt of danger, thus forming a valuable education which has ever stood their country in good stead.

The navy of Elizabeth, however, was only the British navy in infancy, and the heroes themselves were not far removed from buccaneers. Raleigh, Drake, Hawkins and their contemporaries certainly indulged much in piracy, yet in the minds of these leaders there was also something beyond the mere lust of gold. They sincerely believed that, if the Protestant states were to live and prosper, it was imperative to destroy the overwhelming dread of the Spanish power. The Reformation had cut England off from the great powers, and when she sought for a share in the world's commerce, it was denied her, with the consequence that a long and bitter struggle ensued. Then came the Armada, the great naval expedition that was to strike the final blow at Protestantism. This formidable fleet was composed of over 150 vessels, carrying 8,000 sailors, 20,000 soldiers and 3,160 cannons. The news of these hostile preparations aroused all the enthusiasm of England. Her navy, which had been reduced to 36 ships, was rapidly increased until 197 vessels were ready for sea. Lord Howard of Effingham was placed in command; under him were men whose names were already famous in English maritime history — Drake, Hawkins, Frobisher and others. On 19 July 1588 the Spanish Armada entered the Channel. After nine days' fighting, and scattered by the storm, the crippled remnant of that gigantic fleet was struggling to reach home. In 1599 was born Robert Blake, the man from whose career, according to the historian Seeley, the maritime greatness of England dates. After the death of Elizabeth in 1603, James I attempted to reconcile the Catholic and Protestant states of Europe, but his efforts failed. Next came the reign of Charles I with its rebellion and Civil war, till order was restored by Cromwell, who paid great attention to strengthening the navy during his protectorship. Then both France and Spain endeavored to gain the assistance of England in their struggle with each other. Cromwell first offered to support Spain on certain conditions, including freedom of commerce in the West Indies and religious liberty for the English living under Spanish rule. These terms were rejected, and Cromwell offered England's alliance to France, which was accepted. Again the navy came into play. Besides exercising its fighting strength, it held the sea routes for the free passage of merchant ships and troop transports. French and English troops overran the Spanish Netherlands; Dunkirk surrendered to the French and was placed in English hands; the Spanish fleets were destroyed by Blake; Admiral Penn seized Jamaica, and Spain's commercial monopoly was finally broken. But England's weight had been thrown on the side of France, then a growing and ambitious power, destined to become a dangerous rival and England's bitter foe.

The 16th century may be regarded as England's period of preparation and training for her navy; in the 17th century that fighting arm had grown to such importance and strength that the island kingdom was already a world power and had begun colonization on a large scale in the face of overwhelming odds and the most strenuous opposition. In 1731 the original 13 colonies of British North America were completed. In the East, the English East India Company had established trading factories at Surat, Hoogly and Madras by 1739. Charles II had received Bombay from Portugal in 1661 as a part of the dowry of his wife. In 1690 Fort William was established, and round it grew up the town of Calcutta. Bombay, Madras and Calcutta thus became the three centres of British trade in India, and it was only her naval power that enabled England to communicate with and hold these *quasi* possessions. In the War of the Spanish Succession (1702) England had to fear a coalition of France and Spain, and that their fleets would combine against British commerce. So the Grand Alliance was re-formed. In this war, lasting 11 years, England took Gibraltar. By the Treaty of Utrecht (1713) England acquired from France: Newfoundland, Nova Scotia, and Hudson's Bay; from Spain: Gibraltar and Minorca. Four years later we find England, France and Holland forming an alliance directed against Spain. Philip was determined to re-establish the ancient supremacy of Spain and to recover her lost Italian possessions. He reconquered Sardinia and sent a fleet to attack Sicily. England intervened and sent a powerful squadron to oppose the Spaniards. Although there was no declaration of war an engagement took place, in which the Spanish fleet was annihilated. War was again inevitable. France declared war on Spain a few days after England had done so, 10 Jan. 1719. The French and British destroyed a large number of Spanish war and merchant ships, and in 11 months Spain sued for peace. Philip V of Spain next formed an alliance with Austria against France and England, one of the objects being to recover Gibraltar and Minorca. This led to a counter-alliance between England, France, Prussia, Sweden, Denmark and Holland. Russia joined Spain and Austria. Europe was divided into two hostile camps, and a general war seemed inevitable. For two years peace and war hung in the balance, when a Spanish fleet and army suddenly besieged Gibraltar, February 1727. A 12 months' struggle failed to recapture the rock, and peace was again restored.

During the first half of the 18th century it became increasingly evident that the great struggle of the immediate future was to be one between England and the Bourbon powers of France and Spain for colonial and maritime supremacy. The mightiest effort was yet to come. It is not to be wondered at that, in the light of its brilliant achievements, the British navy had become the darling of the English people; furthermore, it was their one and only bulwark against political extinction. The entire population of the United Kingdom at that time was hardly more than that of New York City to-day, and it was frequently difficult to provide the necessary men and boys to man the fleet. The so-called "press gang" was instituted to pick up merchant sailors, kidnap suitable recruits and to arrest deserters. Major and minor poets broke out into songs of the sea, such as 'Hearts of Oak,' 'Britannia, the Pride of the Ocean,' 'Tom Bowling,' 'Rule, Britannia,' 'The Wooden Walls of Old England,' 'Ye Mariners of England,' etc. For good or ill, England was now committed to a world-wide colonial and naval policy; if her navy failed her, she was lost. The clouds were darkening on the international horizon, and England prepared for the supreme test. In India the English and French East India Companies were preparing to fight for control of Indian trade and politics; in America a contest was approaching between the colonists of New France (Canada) and those of New England; there was rivalry also in the West Indies, and both Spain and France were determined to exclude England from the trade in their American possessions. They now concluded a secret family compact by which they bound themselves to destroy the influence of England in the New World. A small, insignificant incident started the conflagration in 1739. It was the ear of a Captain Jenkins. Since 1716 the English had been permitted to send an annual ship to trade with Spanish America. Under cover of this privilege English traders had engaged in extensive smuggling operations, and in consequence the Spanish officials had exercised their rights of search often with undue severity. The English merchants and the Spanish *guarda-costas* had for many years been engaged in intermittent hostilities, when in 1738 Captain Jenkins appeared in Parliament and told how some seven years previously his ear — which he produced — had been torn off by the Spanish naval officer who searched his ship for contraband. After a long controversy between government and opposition, war was declared on Spain 30 Oct. 1739. Admiral Vernon operated in the Caribbean Sea and Commodore Anson was sent round Cape Horn to attack the Spanish settlements in the Pacific. In consequence of Vernon's lack of success and Anson's long absence — over four years — the country soon ceased to take any interest in the war with Spain. British attention was concentrated on defending Maria Theresa against the attacks of Prussia, France, Spain, Sardinia, Saxony and Bavaria. She had ascended the Austrian throne in 1740, when a host of pretenders — Germans, Italians and Spaniards — sprang up to dispute her rights. France supported Spain and the other claimants, therefore England sided with Maria Theresa. But the war was not confined to Europe. England fought against the French in Germany, in North America and in India, besides carrying on a continuous naval struggle against both France and Spain over all the sea routes of the world. The war lasted nine years, followed by eight years of uneasy peace in Europe. But the conflict between France and England in America continued without a break. When the Seven Years' War broke out (1756) England helped Frederick the Great with money and pursued her own struggles in Canada and India. Hawke destroyed the French fleet, Wolfe stormed Quebec, Montreal surrendered, and the whole of Canada fell into English hands. By the Treaty of Paris (1763) England received Canada and Cape Breton Island, certain West Indian islands and Florida. By this time, also, England's supremacy in India was assured. Then came the American revolution, and France agreed to help the colonists. England found herself at war again with her old enemy; Spain and Holland joined France, and the Northern powers of Europe formed a league, called the Armed Neutrality, which was intended to hamper England in her naval war. Now began the terrific struggle for life. Rodney crushed the French fleet in the West Indies and Elliot defended Gibraltar against all the attacks of the Spaniards. The contest lasted six years, and when peace was made, in 1781, France, Spain and Holland were crippled and on the verge of bankruptcy, and England emerged stronger than ever. But she had lost a large part of North America.

Eight years after the war the French Revolution broke out. Its leaders attempted to sow the seeds of the revolution all over Europe and especially against England in India and Ireland. France declared war on 1 Feb. 1793. In defense of the Royalists, Admiral Lord Hood took possession of Toulon harbor, but not having enough troops he had to retreat before the young Captain Napoleon Bonaparte. On 1 June Lord Howe engaged a French fleet. In a few hours the English had lost 1,200 men and 11 ships crippled; the French lost 12 ships and 7,000 men. The English captured nearly all the French West Indies, and Nelson took Corsica. Then Holland also joined France, and England took Cape Colony, which had been Dutch for 143 years. The next year Spain also came in on the side of France, and England again had to fight for her life in all foreign dockyards preparations were being made to crush England. A French expedition sailed to Ireland, reached Bantry Bay, and then went home again. In 1797 England stood alone, expecting an invasion of her shores. Sir John Jervis and Commodore Nelson smashed the Spanish fleet at Saint Vincent; Admiral Duncan crushed the Dutch fleet off Camperdown and Nelson annihilated Napoleon's fleet in Aboukir Bay. Encouraged by England's brilliant naval victories, Russia, Turkey, Italy and Germany renewed their struggles to free themselves from Napoleon's domination. England supplied them with money. In the Mediterranean, Nelson drove the French out of Naples and the Roman states; in fact, the English flag floated for a time over the Capitol at Rome. Europe was ablaze from end to end; cannon thundered in the Atlantic, Pacific and the Mediterranean; Turks and Britons struggled with the French in Syria and Egypt. After Napoleon's victories at Marengo and Hohenlinden, Austria made peace with France and Great Britain was left as Napoleon's sole antagonist. At the beginning of 1801 England was at war with France, Spain, Holland, Russia, Sweden and Denmark. The most important naval action of the war was Nelson's battle of Copenhagen. After the murder of the Tsar Paul I in 1801 the Armed Neutrality broke up and all were anxious for peace, which was made at Amiens in 1802. England restored all she had taken from France, but kept Trinidad and Ceylon, captured from the Dutch, to whom the Cape Colony was restored.

For three years there was peace, which time Napoleon employed in making gigantic preparations for the overthrow of England. In May 1805 he declared war, and the final contest began. Five months later came the crushing defeat off Trafalgar, where Nelson, England's greatest admiral, purchased naval supremacy with his life. The closing scene of the drama was played when the curtain fell at Waterloo in 1815. Only 21 years before France, Spain and Holland all possessed powerful navies; in 1815 these had practically ceased to exist, and those of Spain and Holland have never been restored. From that time the British navy has virtually been the water police of the world; it has exterminated piracy and African slave traffic and maintained what is called the «Pax Britannica» of the seas. Cradled in hardship and 300 years of stern fighting not unmixed with defeats, that navy has been the principal instrument in building and holding together the greatest empire the world has yet seen. Kipling did not exaggerate when he wrote,

> If blood be the price of Admiralty,
> Lord God, we ha' paid in full!

It is estimated that Great Britain has spent approximately $7,500,000,000 on the navy during a century of peace. That period saw enormous changes wrought in the construction of fighting ships. Though naval architecture had undergone improvements and vessels had increased in size, there had been no great alterations in warship design between Armada days and the introduction of iron shipbuilding. The first ironclad, the *Warrior* (1860), fired a shot only two pounds heavier than those of the biggest guns against the Armada. The *Sovereign of the Seas* (1637) was a three-decker of 126 guns; Nelson's flagship at Trafalgar (162 years later) was a three-decker of 100 guns. Nelson's entire fleet of 27 vessels cost about $7,500,000; none of the present British battleships costs less than $11,250,000. Steam power was first introduced into the British navy in 1822, when the *Comet*, a wooden paddle steamer of 238 tons was built at Deptford. Government officials of those days were strongly opposed to both the paddle and the screw, although in 1849 there were 30 screw ships and 70 paddle vessels in the navy. The first battleship built and designed with screw propeller was the 80-gun *Agamemnon* (1852). The introduction of armor-plating brought an immediate revolution in naval ordnance. By 1865 rifled guns had been substituted for the old smooth-bores throughout the fleet. From this period dates the ever-rising competition between stronger armor and more powerful guns. The heavy breech-loading gun was introduced in 1881. During the following 25 years naval construction underwent still further changes. At enormous cost the Admiralty experimented with new types of ships and guns. But the most extraordinary innovations adopted by the British navy date from the appointment in 1904 of Admiral Sir John (now Lord) Fisher to the post of First Sea Lord. He began with a vigorous reorganization of his great department, changed the time-honored strategic disposition of the fleet, and scrapped some 150 ships which he considered useless or obsolete. His most notable achievement, however, was the introduction of the first “all-big-gun” warship, the *Dreadnought*, launched on 10 Feb. 1906. For centuries it had been the custom of naval architects to equip each battleship with guns of different types and calibre. In 1903 an Italian naval engineer, the late General Cuniberti, published an article in Jane's ‘Fighting Ships’ in which he referred to “an ideal British battleship” carrying only big guns. Fisher seized on the idea, and the *Dreadnought*, built in record time, was the result. The consequences were of tremendous importance in British naval history. The appearance of that ship at one stroke made the greatest battleship of any country entirely obsolete; and, furthermore, it rendered the Kiel Canal useless to Germany even if that country also built vessels of that type. It is stated on execellent authority that Fisher long foresaw the coming struggle and that he also prognosticated the year 1914 as the year when Germany would be prepared to challenge Great Britain's navy. He calculated it would take Germany till then to widen the canal, an undertaking that was actually completed in 1914, shortly before the war broke out, at a cost of $55,000,000. There could be no answer to the *Dreadnought* except a vessel of similar type, and the creator of the German navy, Admiral von Tirpitz, had to begin his work over again.

Administration.— The control of the navy is vested in the Admiralty, composed of a first lord, six lords commissioners and two secretaries. The present organization dates from 1912. The first lord, who is invariably a civilian and a member of one of the Houses of Parliament, represents the navy in the cabinet and in the legislature. He is responsible for the general direction and supervision of all business relating to the navy, political and board questions, promotions and removals, appointment of admirals and commanding officers, etc. The attached salary is $25,000. The First Sea Lord is an active, experienced admiral and is responsible for making preparations for war; he advises on all large questions of naval policy. His salary, like that of the second, third and fourth lords, is $7,500. The Second Sea Lord attends to the manning and training of the fleet, details of complements of ships and establishments, barracks, education, coastguards, reserves, hospitals and discipline. The Third Sea lord is responsible for machinery, armor, guns, aeroplanes, airships, dockyards, construction, etc. The Fourth Sea Lord deals with transport services, including hired auxiliary vessels other than armed cruisers; coaling, victualing, payments, allowances, pensions, etc. The Civil Lord, who is not a naval man, controls works, buildings, purchases of land, dock police, etc. There is further an additional sea lord, whose duties are chiefly connected with contracts for machinery, salvage, disposal of obsolete ships, etc. The parliamentary and financial secretary deals with all matters of finance, estimates, expenditure, accounts, purchase of ships, stores, and payment for hire of auxiliary vessels. The permanent secretary controls the general office organization of the various departments and conducts correspondence with foreign naval attachés. The Committee of Imperial Defence consider questions of imperial defence from the point of view of the navy, army, India and the self-governing states of the empire. Canada, Australia and New Zealand make direct contributions to the navy, and the Federated Malay States also provided the cost of a battleship.

Naval Policy.— There has been considerable discussion in recent years as to the disposition and use of the navy in time of war. One side contended that the main strength of the navy should be concentrated in home waters. The so-called “Blue Water School,” on the other hand, maintained that it was the duty of the fleet to be there where a possible enemy's fleet was located, whatever part of the world that might be. Until recent years Great Britain maintained strong squadrons on the China station and in the Mediterranean. The Anglo-Japanese Agreement enabled Britain to withdraw her fleet from the former position, and the Entente Cordiale with France from the latter. Since 1905 the main strength of the British navy has been concentrated in the North Sea and in the Channel, in view of the growing menace of the German navy. Subsequent events have proved that this last was the better arrangement, for it enabled the navy to apply an effective blockade of the German coasts the moment war was declared. As has happened so frequently during its long history, the British navy instantly became the predominant factor in the great struggle. The gigantic armies of Germany, Austria, France and Russia, numbering a possible 16,000,000 men, hardly aroused so much interest and speculation in the world as did the 150,000 men who then formed the *personnel* of Britain's fighting fleet. The navy was ready to meet any emergency. Only a few days before the outbreak of war the king had reviewed his fleet — or at least half of it. That half consisted of some 260 vessels, the most powerful fleet ever mustered in British waters. The day before England declared war Mr. Winston Spencer Churchill, then First Lord of the Admiralty, informed his colleagues of the cabinet that “the whole sea power of Britain was in readiness for war.” The Home Fleet was divided into three units, of which the first was arranged into four battle squadrons including the flagship of the commander-in-chief. The first of these consisted of eight battleships — dreadnoughts and super-dreadnoughts — seven carrying ten 12-inch guns, and one of them ten 13.5-inch guns. In the second squadron were eight super-dreadnoughts, each carrying ten 13.5-inch guns. The third squadron consisted of eight vessels of the pre-dreadnought type, armed with four 12-inch, four 9.2-inch and ten 6-inch guns. The fourth squadron contained three dreadnoughts of ten 12-inch guns each and one pre-dreadnought with four 12-inch and ten 9.2-inch guns. A battle cruiser squadron of four ships was attached to the first fleet, three with eight 13.5-inch guns, and one with eight 12-inch guns; the second cruiser squadron of four armored cruisers; the third cruiser squadron of four cruisers of the Devonshire class; the fourth cruiser squadron of four vessels of the Monmouth class and one light cruiser; the first light cruiser squadron; a squadron of six gunboats for mine sweeping; and four flotillas of destroyers with a flotilla cruiser attached to each. Behind this first line of defense there stood the second fleet of two battle squadrons, one of eight pre-dreadnoughts and one of six. To these were attached the fifth and sixth cruiser squadrons, seven mine-layers, four patrol flotillas of destroyers and torpedo-boats and seven submarine flotillas. Next behind these came the third line, consisting of two battle squadrons of comparatively old ships and six cruiser squadrons. In addition to this formidable array Great Britain had at the time, in the Mediterranean, three battle cruisers, four armored cruisers, four ordinary cruisers and a flotilla of 17 destroyers, besides submarines and torpedo-boats. In the Far East there were one battle ship, two cruisers and four smaller vessels in the East India squadron. On the China station there were one battleship, two armored cruisers, two cruisers, a number of gunboats, eight destroyers, besides submarines and torpedo-boats. The New Zealand division contained four cruisers, while the Australian fleet consisted of one battle cruiser, three cruisers, three destroyers and two submarines. Various cruisers and gunboats were stationed at the Cape, the west coast of Africa, and the east and west coasts of America; four armored cruisers and one ordinary cruiser patroled the Western Atlantic. To the total strength of Britain must be added two Turkish battleships at the time building in England, which were commandeered, and two destroyers purchased from Chile. The following figures show the principal classes in 1914:

Super-dreadnoughts....	14	Armored cruisers......	34
Dreadnoughts..........	18	Cruisers...............	87
Pre-dreadnoughts......	38	Destroyers............	227
Super-dreadnoughts under construction.....	3	Torpedo-boats.........	109
		Submarines...........	75
Total...........	73	Tctal...........	532

The following table, dating to 1 Jan. 1914, was issued by the British government on 6 March 1914 to show the comparative strength of the principal naval powers. Battleships and armored cruisers over 20 years old are omitted:

BUILT.

	Great Britain	France	Russia	Germany	Italy	Austria-Hungary	United States	Japan
Battleships	58	21	8	35	9	14	30	17
Coast defense ships, armored	......	......	......	......	......	......	10	......
Battle cruisers	9	......	......	4	......	......	......	1
Cruisers	47	24	12	9	9	2	17	15
Cruisers, light	65	8	2	43	14	9	18	19
Torpedo-vessels	25	3	......	......	3	11	2	3
Torpedo-boat destroyers	201	80	80	133	30	15	52	51
Torpedo-boats	106	153	25	80	94	58	21	33
Submarines	69	50	25	24	18	6	29	13
	580	339	152	328	177	115	179	152

BUILDING.

	Great Britain	France	Russia	Germany	Italy	Austria-Hungary	United States	Japan
Battleships	14	10	7	6	5	2	6	2
Battle cruisers	1	......	4	3	......	......	......	3
Cruisers	......	......	......	......	......	......	......	......
Cruisers, light	20	......	8	6	4	3	......	......
Torpedo-vessels	1	......	......	......	......	......	2	......
Torpedo-boat destroyers	36	7	45	12	16	3	8	2
Torpedo-boats	......	......	......	......	1	27	......	......
Submarines	29	26	18	14(?)	2	5	17	2
	101	43	82	41	28	40	33	9

During the first four years of the war the British navy had tripled its personnel and doubled its fighting armament. It transported by water over 13,000,000 men, 2,000,000 horses and mules, 25,000,000 tons of explosives, 51,000,000 tons of oil and coal, and 130,000,000 tons of food and stores.

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46. THE BRITISH ARMY. The Regular Army.— The British army is in many respects like the British Constitution. It has grown, it has not been made. No single idea has dominated its history, no directing mind has prescribed its form or defined its functions. But while the forces, which formed and molded the British Constitution, and made it from time to time the reflex of the prevailing opinion of the British people, have exercised a constant pressure — a pressure which has never been relaxed — the forces which have produced the British army of to-day have been intermittent and irregular. The history of the British army is a long record of vicissitudes of public favor and public neglect. To a nation in whose long history the gates of the Temple of Janus have rarely been closed for a decade, each new war has come as a surprise. Every war, whether it has ended in victory or defeat, has furnished the British people with lessons which they have vowed to learn and never to forget, and which they have invariably forgotten before the ink has dried on the peace preliminaries. Every war has brought with it good resolutions born of anxiety and alarm, and every peace has produced the apathy, the neglect and the self-confidence which are the outcome of real or fancied security.

It would be unjust, and untrue to historical teaching, to infer from these facts that the British are an unwarlike, or, in all their public concerns, an improvident people. The population of the United Kingdom is composed of warlike races, and in regard to the conduct of public affairs it cannot be said that England has been behind the rest of the world. But it is possible to be a warlike without being a military nation, and there can be no doubt that the scientific evolution of a consistent military policy in the United Kingdom has not kept pace with other branches of national development.

The reason is not far to seek. An insular position and the immense protection afforded by a powerful navy have relieved the inhabitants of the British Islands from the dangers which ever threaten the great nations of Continental Europe whose long land frontiers expose them to attack by an ambitious and unfriendly neighbor. For nearly 300 years the people of England have been spared the knowledge of what war on their own soil actually means. While from Brest to Moscow, from Bergen to Gibraltar, every part of Europe has rung to the tramp of hostile soldiery, and has been the suffering witness of the tragedy of war, the dwellers in English counties carry back their immemorial tradition of undisturbed peace to the day when Oliver Cromwell won the last great battle fought on English soil on the field of Worcester.

Once, and once only since the creation of modern firearms did the people of England come in contact with the realities of war. In 1645 Parliament in conflict with the king found itself confronted by the necessity of fighting, or surrendering to an implacable enemy. Following the custom of the country, the House of Commons sought at first to meet the emergency by the aid of amateur soldiers, maintained by voluntary contributions. But the logic of facts soon convinced them that war cannot be trifled with. The «New Model» Army was called into existence by Act of Parliament, funds were provided by vote of the House of Commons, compulsory service was imposed when volunteering failed to produce the required number of men; and the recalcitrant were hanged. A Regular Army was called into existence, and that Regular Army almost immediately became a «Standing Army.» It is from the days of the «New Model» that the history of the Standing Army of England really dates. War on English soil taught its lessons to a practical people. To the Commonwealth England owes, not only the establishment of her standing army, but the actual groundwork of the military institutions of the present day. One of the most famous regiments of the British army, the Coldstream Guards, came into existence at this time; and the very establishment of the modern British cavalry and infantry regiment is practically what it was made by Oliver Cromwell and the soldiers of his day.

In 1651 the civil war ended. In 1658 Oliver Cromwell died, and a military *coup d'état* placed Charles II on the throne. Never since that day has a British Parliament legislated for the army with a knowledge of war born of experience. A generation grew up which had forgotten the lessons of Marston Moor and Worcester. The reaction was prompt, and its effect far reaching. ~~The army~~

soon became to be regarded as an evil, scarcely a necessary evil. The soldier soon learnt that the utmost he could expect was toleration. The accession of a foreign king surrounded by Dutch guards increased that antipathy to the army, which for the next two centuries marked the proceedings of Parliament. In 1689 was passed the first Mutiny Act. The primary object of the act was to confer upon the sovereign the right to punish certain military offences not dealt with by the ordinary law; but the act contained a section of a totally different purport. The words which have become famous run as follows: «The raising or keeping of a standing army within the United Kingdom of Great Britain and Ireland in time of peace, unless it be with the consent of Parliament, is against law.»

The law as passed in the time of King William III is to this day solemnly re-enacted every year by Parliament, and the illegality of maintaining a standing army is palliated by a special Act of Dispensation for one year only. This annual performance has become a meaningless anachronism. The necessity for maintaining a standing army in time of peace is no longer questioned or questionable, and the army itself has long ceased to be the instrument of a sovereign, and has become the servant of the nation. But the original passage of the act and its renewal by many succeeding Parliaments is typical of the tone and temper of the Legislature toward an institution which is as essential to the safety and welfare of the state as Parliament itself.

The result of this want of sympathy between Parliament and the army is very noticeable. The favor of the Legislature, and the funds which that favor can alone provide, have been available during periods of crisis and national danger: They have been grudgingly given or withheld in those intervals of peace which ought also to be intervals of preparation. As a result there has been an absence of continuity, and of deliberate adaptation of means to ends, which has greatly interfered with the proper development of the military power of Great Britain, and have provided her with military institutions which bear upon them the unmistakable evidence of their having been created at haphazard, altered to meet political rather than military exigencies, and adapted to meet a single emergency rather than to deal scientifically with the work of a world-wide empire.

Under these circumstances the services which the regular army of Britain has rendered are indeed a marvel. In every land and under every sky, against the highly trained armies of Europe, against the half disciplined hosts of Oriental princes, against savage tribes, formidable by reason of their fanaticism, courage and numbers, the regular army of Britain has fought with varying fortunes but with never failing tenacity and devotion. There is no soil which does not cover the grave of the British soldier. In the broad valley of the Danube, on the plains of Belgium, on the shores of the Black Sea, in the passes of Spain, among the vineyards of France they are to be found. The «Redcoats» have fought and died on the plains of India, under the walls of the imperial cities of China; on the heights of the Saint Lawrence; in the valley of the Hudson; under the ramparts of New Orleans; in South American cities; before the stockades of the Maori in New Zealand and in innumerable islands in every sea. On the great African Continent, North and South, East and West, from the Pyramids to Table Mountain; from the blazing shores of the Red Sea, to the swamps of the Gold Coast and the Niger, they have obeyed orders, and laid down their lives for «the safety, honor and welfare of their Sovereign and his Dominions.» But they have not died in vain. If it be true that the tap of the British drum follows the rising sun round the world, it is true also that the planting of the British flag in five continents is largely due to the patient heroism of the British soldier. Rarely commanded by generals of exceptional genius; almost invariably suffering from the apathy and neglect of Parliament in peace time, and from the faulty administration in war which is the certain result of neglect in time of peace, the British soldier by dint of certain great qualities which he possesses has held his own. To the regimental officers and to the non-commissioned officers credit is above all due. They have been, and still are, the true strength of the British army.

What is the nature of this army which has suffered and accomplished so much? In its character and composition it is as unique as the circumstances which have created it. There may be better armies than the British, there are undoubtedly worse armies, but there is no army like it. It shares with the army of the United States the peculiarity of being recruited by voluntary enlistment and not by compulsion in any form. It has a further peculiarity which, until recent foreign conquests planted the Stars and Stripes in the China Seas, distinguished it even from the army of the United States. Nearly half of the Regular Army of Britain is maintained on a war footing in time of peace, is maintained in distant lands, and to a large extent in tropical or sub-tropical countries. The population of India is over 315,000,000 and the military force which defends the great Peninsula and keeps the peace from Quetta to Cape Camorin amounts to 239,730 all told. Of these 75,895 are British soldiers enlisted within the United Kingdom; the remainder are the troops of the Indian army, 161,085 natives commanded by 2,751 officers, of which the superior officers are British. There are also «Imperial Service» troops raised by native states and held at the disposal of the government; they number about 20,000, including a strong force of cavalry; 36,000 reserves of the native army, and close on 40,000 white volunteers, besides 3,000 reservists.

South Africa, the Mediterranean fortresses of Gibraltar and Malta, the distant Eastern Ports of Singapore and Hong Kong, make further demands upon the Regular Army. According to the regimental establishment of 1913–14 (the last two normal years before the war) 33,128 British regular troops were serving in South Africa and the Colonies. This number, of course, does not include specially enlisted Colonial corps and native troops paid for by the Imperial Exchequer. It is the necessity for maintaining this great force abroad that makes the British army essentially a voluntary army. Conscription for service abroad in time of peace is impossible. The young soldier cannot endure the climate of India, and a youth enlisted at 18, must perforce remain for two years at home before he becomes physically qualified for foreign service. This fact not only makes it necessary that the service should be voluntary, but that it should be long and that it should greatly exceed the limit of two years which is the term now accepted in the principal conscript armies of the world.

For this voluntary army there are enlisted on an average 38,000 men in a normal year. The total is sometimes exceeded; there is rarely any difficulty in reaching it. There is no reason why there should be a difficulty. The old prejudice against military service due to the savage conditions of the soldier's life, his scanty pay, his squalid surroundings, lived long and died hard; indeed it is not altogether dead yet. But the life, pay and prospects of the British soldier at the present day are such as may reasonably attract young men of spirit and ambition.

When the soldier receives his pay every need has already been provided for. He has been clothed, fed, housed, doctored and educated; his general health has been looked after, his amusements furnished. If he chooses to remain in the service his pay increases with every step in rank; and, if his conduct be good, he may look forward with certainty to retirement at the age of 39 with a life pension. Not all the recruits who enter the army are good, nor do they all become useful soldiers. But the unfit are soon eliminated and the quality of the special branches, the Royal Engineers, the Royal Artillery, the Cavalry and the Guards is very high. A British regiment returning from India after a long tour of service in that country, will bear comparison with any body of fighting men of equal numb rs in the world.

The ordinary period of color service in the British army varies from six to nine years, but the brigade of guards are enlisted for three years with the colors, the men having the right to prolong their service to eight years. Soldiers are generally permitted, if their conduct has been good, to extend their first term of service and to remain with the colors for 12, and in some cases, for 21 years. In addition to the men with the colors there are the men forming the Army Reserve. The Army Reserve is an outcome of the great reform accomplished by Lord Cardwell in 1870. That distinguished War Minister was the first to divide the soldiers' service into two periods, the first with the colors, the second in the reserve. The period of service is six years. The reservist is liable to be recalled to his regiment in case of war or national emergency only.

The recruits for the Regular Army are drawn from all parts of the United Kingdom, as well as from the colonies.

The Territorial Force.— The British Army formerly comprised the Regular Army and the «Auxiliary Forces,» the latter including the Militia, the Yeomanry and the Volunteers. Since 1907 it consists of the «Regular Army» and the «Territorial Army.» The term «Regular Army» is applied to the regularly embodied troops and the army reserve.

The «Territorial and Reserve Forces Act» of 1907 abolished the militia as such. Of the 124 militia battalions in the United Kingdom 74 were converted into reserve battalions of the Regular Army, viz.: 66 as 3d battalions of the 66 line regiments (of two battalions each), and 27 as 4th battalions to the same number of regiments. The Militia Artilley has become, with the exception of certain Irish battalions, units of reserve field artillery, and the militia engineer battalions are now turned into reserve siege and railway companies.

All men of reserve units, whether originally militiamen or directly recruited, are enlisted as «special reservists» of the Regular Army. That is to say, they are partially trained in time of peace and are available for transfer to the Regular Army in time of war, if required. The period of initial, or recruit, training is six months for all arms, followed by an annual training of fifteen days, with the addition of six days' musketry for the infantry. The 3d battalions also do the work of regimental depots, which have been abolished. They are, in fact, training battalions, supplying material to the battalions of the first line both in peace and war. The 27 fourth or «extra» battalions are available for service abroad, in event of war, as entire units. The regular field artilley is also provided with training units, one group or «brigade» of three batteries for each of the six field divisions. These units train the special reservists for the artillery, and are to supply the ammunition columns on mobilization. Fourteen reserve cavalry regiments were also formed.

The Yeomanry, styled since 1901 «Imperial Yeomanry,» and the volunteers, have changed their status. They now form the cavalry and infantry of the territorial army, which also comprises a proportionate strength of artillery (newly created) including horse and field batteries.

The Territorial Army is intended for home defense, though over 20,000 officers and men accepted liability for service abroad in time of war. Men joining the territorial forces are attested and enlisted instead of simply enrolled. The age for enlistment is from 17 to 35 and the period of engagement four years, with the option of re-engagement for further periods, not exceeding four years, in each case, up to the age of 40.

Discharge can be obtained at any time by giving three months' notice and paying $25, but both notice and payment may be dispensed with in special cases Training is on «Volunteer lines,» that is to say, there is no period of continuous training for recruits, as in all other national militias, and the annual training is 15 days in camp as a maximum and eight as a minimum. Other drills and rifle practise are carried out in the men's own time. Absence from training, or failure to complete the necessary number of drills, renders the territorial soldier liable to a fine of $25 or less, according to circumstances.

The territorial army consits of 36 regiments of Yeomanry, 14 horse artillery batteries, 57 «brigades» of field artillery, 14 heavy batteries, 89 companies of garrison artillery, 103 companies of engineers, a railway battalion, 194 battalions of infantry, 15 cyclist battalions, with departmental troops, medical and other subsidiary services. The officers, except the divisional generals and some of the brigadiers and staff officers, are non-professional. A scheme for the provision of officers by means of officers (volunteer) training corps has been instituted. These training corps are merely the pre-existing Volunteer Corps at the Universities (senior division) and the similar school cadets (junior division).

All ranks of the territorial forces receive pay when called out, at the same rates as in the Regular Army. A reserve for the territorial army has been approved. It is open to all who have served in the territorial army or in the old volunteers for four years, up to the age of 40.

The general officers of commands are responsible to the Army Council for the training of all the troops in their commands, but the administration of the territorial army is vested in the County Associations, which stand in much the same relation to the territorial forces as the War Office does to the Regular Army. That is to say, they undertake the raising, equipment and maintenance of the force. They are also charged with the care of reservists and discharged soldiers. Each County Association has its own budget, the funds being provided by the War Office on regularly prepared estimates, based on previous expenditure under the various approved heads. On mobilization, the units which are to take the field (called the field army or "expeditionary force"), comprising about four-fifths of the regular force at home, are brought up to full war strength by the incorporation of the reserves. At the same time the special reservists are called up and fill the 3d and 4th battalions of infantry regiments and other reserve units. A small proportion of these men at once join the field army for service with the ammunition columns, etc. The remainder will be available, after further training, to supply losses in the field. The territorial army, also, is to be embodied whenever mobilization takes place, and is then to undergo a training of six months, after which it is supposed that the force will be ready to meet the enemy in event of an invasion.

It will be observed that, for the first time in the history of the British army, the necessity for creating a secondary reserve (answering to the Ersatz, or supplementary reserve of continental armies, to make good the waste of war), has been recognized. The formation of an organized territorial army was also a great step in advance. The territorial army is confined to England, Scotland and Wales.

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[Note.—Since the foregoing article was written its distinguished author has passed away and the British army has undergone such revolutionary changes (1914–17) as no former War Minister could ever have imagined. Shortly after the outbreak of the European War the government suspended publication of official details of the army beyond lists of officers' promotions and casualties. Within the first two years of the war Great Britain had adopted a system of conscription and raised an army of 4,000,000 men, trained and fully equipped. This great task was accomplished by the organizing genius of Lord Kitchener (q.v.). On 10 Oct. 1916 its strength was given as over 5,000,000.

The British army is administered by an Army Council consisting of the Secretary of War and six departmental heads of the War Office: (1) the Chief of the Imperial Staff, who is responsible for drawing up plans of attack and defense, for military training, intelligence work, and the higher training of officers; (2) the Adjutant-General, who deals with recruiting, internal economy, discipline and the medical service; (3) the Quartermaster-General, who is responsible for equipment, transport, supply and remounts; (4) the Master-General of the Ordnance, who is responsible for armament and works; (5) the Parliamentary Under-Secretary of State, who represents the Territorial Army; and (6) the Finance Member. The Inspector-General of the Forces keeps the Army Council informed as to general conditions, state of efficiency, etc., of all branches of the army. The British army has no commander-in-chief; that office was abolished in 1904. Lord Roberts (q.v.) was the last incumbent. A new official — the Inspector-General of the Forces — was then created. The Army Council administers, but does not command, the army. The Home Army is divided into seven commands with a general at the head of each: (1) Aldershot; (2) Southern; (3) Eastern; (4) Irish; (5) Scottish; (6) Northern; (7) Western. London forms an independent district under a separate commander. There is also a commander-in-chief in India; in Egypt (the Sirdar), and in the Mediterranean (Malta, Cyprus and Gibraltar). The self-governing dominions provide their own troops and commanders. In the Crown Colonies and Protectorates the commissioner or governor is commander-in-chief of the local forces.

Parliament sanctioned an increase of 2,000,000 men between August and November, 1914; recruits poured in at the rate of 30,000 per week, and by 1916 the numbers had reached close on 4,000,000. On 24 May 1916 a Military

Service Bill was brought into operation providing for compulsory military service of all men, married and unmarried, between the ages of 18 and 41. A «Ministry of Munitions» was established 5 June 1915 to take over and control works for the manufacture of war material. By 1 May in the following year there were 3,493 munition factories under the control of the Ministry. The Rt. Hon. David Lloyd George, formerly Chancellor of the Exchequer, was the first head of the new department. During the first four years of the war nearly 8,000,000 men had been inducted into the army, while munitions and stores were produced by 94 national arsenals and over 5,000 government controlled factories, employing over 2,000,000 men and nearly as many women.]

47. BRITISH FOREIGN POLICY IN EUROPE. For about five centuries after the fall of the Roman Empire, that is, from the 5th up to the opening of the 11th century, there was one absorbing issue before Europe. That issue was whether European civilization was to continue to exist or not. During that time the Moslems on the south, the Danes, Swedes, Goths and Norwegians from the Cattegat, and eastward the Slavs and Hungarians swarmed round the dissolving limbs of Christendom, so that Christendom bade fair to disappear. As Baronius said, «it was as if Christ slept in the vessel that bore mankind.» The 10th century brought Europe nearest to destruction. But about the year 1000 an almost magical change began to operate. Invasion ceased. Europe was saved. Since that time external barbarism has often threatened, but never with overwhelming force.

The next epoch of Europe has lasted from the 11th century up to our own day and is not yet concluded. Europeans are busy finding a solution for a problem which has haunted them for eight centuries. That problem is the reorganization of Europe after its almost complete destruction by the barbarians. To the most profound minds two ways of reconstructing Europe have presented themselves. The first was to amalgamate this small continent under one supreme authority, and to do what the statesmen of China and of America have achieved so admirably for China and the United States. Great prestige has attached to that solution because the Romans had carried it out to a large extent already with fair political results. But the solution has derived its fundamental authority from the fact that there is a certain amount of reasonableness and utility in the idea of having one sovereignty to control the peninsula which Europe is.

The chief exponents of this great idea can easily be named. First, there was the mediæval Papacy which, springing up in the 11th century, claimed universal sovereignty as a right. As Pope Gregory VII said at that date, the Papacy is the Master of Emperors. Then in the 13th century, when the mediæval Papacy had fallen, the French monarchy made a similar attempt. Mathew Pavis, Peter Dubois and Jandun all agreed that France was the new claimant to universal power. Later Pope Urban, in 1382, pointed out that «France desires the universal monarchy of the world.»

The next successor in the field was the House of Hapsburg. That family fought for this idea during two centuries, from the middle of the 15th to the middle of the 17th century. «Austria's mission is to rule the world,» was their motto, and their greatest prince was Charles V. They came in course of time to rule both at Vienna and at Madrid. The two branches of the house were intertwined together. Together they fell. The decline of the German branch was registered by the peace of Westphalia in 1648, and that of the Spanish branch by the peace of the Pyrenees in 1659.

The next power which strove to raise from the ground the broken sceptre of the Cæsars was France again, under Louis XIV. Louis inaugurated their policy in 1661. This dream of French supremacy in Europe was consistently pursued by France up to 1815. Its consummate exponent was Napoleon, who claimed to be the heir of the Cæsars. In the summer of 1808 he attained the nearest to his ambition when he told Talleyrand that he was now «master of Europe.»

After Napoleon had fallen in 1815, Russia succeeded to his aspirations. In 1812 she had extinguished the ambitions of Napoleon in the Russian snow. The last two centuries had been a route march for her, east as well as west, south as well as north. Her day had come, she thought, but the Crimean War showed her to be not so strong as she imagined, and since that date, Germany, under Prince Bismarck and later under William II, has arisen to dispute the title.

But in spite of all these constantly renewed ambitions to grip the supremacy of Europe, all aspirants to supreme dominion have failed. No one has been strong enough to reconstitute the empire of Rome. What force has thwarted this consummation? It is the force of nationality. The issue before Europe has been the issue between despotism and freedom. Freedom has won. Europe has chosen to organize herself into a number of mutually independent nations, some 20 in number, rather than to place herself in subjection to one supreme authority, whether of Pope or of Emperor.

The definite appearance of the national spirit, and therefore of nations, may be dated from the 13th century. At that time a whole cluster of young nations appeared on the horizon. Some were powerful, such as France, or insignificant, such as Austria; some monarchial, such as Castile, or republican, such as Florence; some Slavonic, such as Poland, or Romance, such as Aragon; or Teutonic, such as Holland; some dying like the Arelate, or full of the germs of progress, like Brandenburg, or precarious, like Hungary. What a bewildering scene! What an inextricable task to follow the dance of these atoms for seven centuries up to the present day, as they coalesce and disperse and again amalgamate into the nations which we know so well!

Enough has been said to make quite plain what the main history of European politics really is. It consists of a conflict between two theories of government embodied in men's passions. One theory proclaims the advantage of unity under one authority. The other theory announces the goodliness of nationality of freedom of a Europe split into many independent sovereignties. Since the 11th century Europe has been rent by this question. Wars innumerable have been fought over it. Such has been the fearful legacy of ambition left by the Cæsars to the barbarians.

Having now indicated the nature of the politics of Europe, let us turn to England, this minute speck of an islet off the European coast. What has been her policy as regards this continent? Japan, an island similarly situated, has enjoyed an easy time, because China, on the coast opposite, has been the most peaceable neighbor in the world. But England has always been faced by powerful and ambitious neighbors. Great Britain had imperatively to determine whether she should side with autocracy, as represented by the Pope, by the Spanish Armada, by Louis XIV, Napoleon, the Tsar Nicholas, Bismarck and William II; or whether she should side with the force of freedom ever ready to resist these powers. It has been somewhat a hard choice. England has often tried to shut her eyes and take no part; has sometimes taken the side of power and authority, as James I did in siding with Spain, or as Charles II did in siding with France. But, on the whole, since the days of William the Conqueror England has sided with freedom. For the liberties of Europe ever coincide with the interests of England. Hence it was that Great Britain opposed the Papacy, and Spain, and Louis XIV, and Napoleon and the Kaiser. For this reason Great Britain defended the integrity of Turkey in 1854 and 1878. To hold the balance of power in Europe is a conception deeply rooted in British foreign policy. It was as familiar to Henry VIII and Wolsey as to the British government in August 1914. It is for this reason in part that Britain has ever been the champion of small states, of Holland and Belgium and Portugal, and Switzerland, each of which is a bar against autocracy and a pledge of European freedom. Hence English «perfidiousness,» that is aptitude ever to abandon the company of a too dominant star. Hence the profound and fundamental indifference to European politics, so long as no power is visibly in the ascendant across the Channel. Hence, too, the predominant part which, in all the real crises of European history, England has played. Who but the British thwarted the Pope, and the Hapsburgs, and Louis XIV, and Napoleon? That Great Britain would throw her weight against the strongest belligerent in any general European war was a mathematical certainty; she has consistently followed that policy for centuries, and it is a policy dictated neither by covetousness nor jealousy, but by the first law of nature — self preservation.

For Americans all this has a good deal of significance. What is to be the policy of the United States in Europe? The interests of the United States in Europe are nothing like so vital and immediate as those of England; but subject to that consideration, they run on parallel lines. It can never be the interest of the United States to be faced across the Atlantic by an united and amalgamated Europe. For, first, that would mean the conquest of England; and next, the power thus organized would be a menace to the greatness of the United States. Just as the United States desires the open door and the balance of power in the Far East, so and for the same reason, she needs a Europe in which national freedom prevails, rather than a Europe armed under one authority and dictatress of the world. That consideration is not yet materialized in the American mind. But the day will come when it will be materialized and then it will be seen that the identity of the European policy of England and of the United States constitutes yet another link between the two nations.

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48. BRITISH FOREIGN POLICY IN INDIA. There is no space for even a brief sketch of the marvellous story of the British wooing and winning of the great peninsula, which contains nearly one-fifth of the human race. A glance at the map of India will show that others also wooed, but did not win, and will indicate that all paid their addresses at three important points on the long coast line, so singularly lacking in harbors. Near Bombay on the West, the Portuguese still hold the beautiful land of Goa; near Madras on the East, the French retain Pondicherry, and up the Hooghly river above Calcutta, the tri-color still flies over the little settlement of Chandernagore. Dutch and Danes no longer have settlements in India, but these, too, have left their traces. From Madras, Bombay and Calcutta — isolated and unconscious — strenuous traders generated the force, which was in the course of time to create and consolidate one of the most remarkable Empires which the world has ever seen.

We cannot here dwell on the romantic deeds of the great builders of the huge fabric, known as British India.

The map will also show that only three-fifths of the Indian continent are colored red. The remaining two-fifths belong to the Indian princes and are not British territory. If the policy so keenly followed by Lord Dalhousie had not been arrested by the convulsion known as the Indian Mutiny, it is possible that a considerable portion of the territory now belonging to the Indian Feudatories would have passed by lapse or other causes into British possession. But happily by the wise grant of the right of adoption to the Indian princes the danger of further annexation disappeared. It will be noticed, if reference again be made to the map of India, that the territories of the Indian princes are widely scattered. There are large countries belonging to princes, such as the Nizam of Hyderabad and the Maharaja of Mysore in the South, and there are vast areas held by groups of chiefs such as the congeries of states known as central India; where the great Mahratta dynasties hold sway — Rajputana where the Rajput princes rule, and the large tract in the Punjab where the Sikh states lie. It is difficult to define the exact relation of the Indian princes to the Crown, but the King of England and Emperor of India may in a sense be styled a «Ruler of Princes.» The ties which bind the Indian princes to the British Crown have been described by Lord Curzon:

«They are peculiar and significant, and, so far as I know, they have no parallel in any other country of the world. The political system of India is neither Feudalism nor Federation; it is contained in no constitution; it does not always rest on a treaty and it bears no resemblance to a league. It represents a series of relationships that have grown up between the Crown and the Indian Princes under widely differing historical conditions but which in process of time have gradually conformed to a single type. The sovereignty of the Crown is everywhere unchallenged. It has itself laid down the limitations of its own prerogative. Conversely, the duties and the service of the states are implicitly recognized, and as a rule, faithfully discharged.»

The conquest of Upper Burmah, carried out by Lord Dufferin, was under the circumstances unavoidable. There have also been changes in Baluchistan of a political rather than a territorial nature. But with these exceptions, India, from the time when it passed out of the hands of the company of merchants into the keeping of the Crown, has remained content with the frontiers which nature had suggested and Lord Dalhousie had secured. They are good frontiers, and enable a comparatively small force of some 230,000 men to keep the peace, internal and external, of some 300,000,000 people. India has been likened to a «fortress with the vast moat of the sea on two of her faces and with mountains for her walls on the remainder.» For the Hindus the «black water,» as they call the ocean, was protection enough until the navies came out of the west, while to the north stood the stupendous mountains of the Himalaya. But to the northwest, the frontier, difficult and dangerous though it was, admits of passage, and through the defiles which occur in the marshes between Peshawar and Quetta the waves of invasion have often found their way. And so long as Great Britain holds command of the sea, it is only through the northwestern frontier that India can be threatened.

Since 1857, the year of the Indian Mutiny, the chief preoccupation of the Viceroys has been the internal development of the vast and varied continent, split up into so many distinct countries and peopled by races of extraordinary diversity. The terms «India» and «Indian» are too often used with most misleading results, and it would be as safe to predicate anything of «India» and the «Indians» on any subject ranging from politics to weather, as it would be to generalize on Europe and the Europeans. The only thing in India which is the same and universal is the system of government, and many are of opinion that in this sameness and uniformity there is danger. But uniformity on the whole tends to efficiency and is economical, and since India passed under the direct control of the Crown the exigencies of finances have rendered strict economy essential. It would be difficult to find any part of the world where government is carried on so cheaply as in India. Some 1,000 officers of the Indian Civil Service manage the affairs of some 244,000,000 people in British India, and have occasionally an indirect influence on the welfare of the remaining 70,000,000 who live in the territories of the Indian Princes. British India is divided into large administrative areas known as Districts, and in the whole world there is no such work as that of the District Officer. Often isolated from his countrymen he toils day and night for the people committed to his charge. They look to him for everything and in their own language he is their Mabáp — their Mother and Father. His one idea is that they should not be harassed or worried whether it be by tyrannous neighbors, by exacting underlings, or by an overzealous government. The District Officer at his best is rarely seen except by the people away in the villages. Viceroys and distinguished travelers cannot see him at his real work, but for all that they quickly learn that the good government of India ultimately depends on the good District Officer. Perhaps the best critics of English administration in India are the French, and they have borne generous testimony to the system and wonder at the fewness of the civil servants. As it is in the Civil Service, so it is in the other many efficient departments of official work: the British officers are few, and their work and responsibilities are enormous. It is due perhaps to the responsible nature of the work that the strenuous life prevails in spite of climate and solitude.

Far away from the Districts, from the canals, railways and forests, where men live their solitary lives on salaries none too generous, there is a military cantonment with a mixed brigade of British and Indian troops. Strong as may be the District Officer and unquestioned as may be his authority among the people, the knowledge that there are soldiers of the fair faces and guns within a few hundred miles undoubtedly acts as a sanction and a steadying influence on the unruly spirits and latent forces of disorder, ready in every district to spring if there be the least sign of weakness.

The Oriental respects most of the respectable qualities, but to him the great quality is strength. There is a word in use throughout India — Ikbál. If the Ikbál of the Sirkar is good, that is if the prestige of government stands high, all is well. But if it is shaken all the splendid structure which the British have raised in India will also be sorely shaken. It is the knowledge of this prestige and its power, and the sense that it must be inviolate, that brings anxiety and pause to a Viceroy and his government, when some reform really touching the people or some military operation to quell a turbulent clan on the frontiers is under discussion. In India risks must be run, but caution is the characteristic of the Indian bureaucracy. It is this same knowledge of prestige and of what is connoted by the loss of it, which has hitherto made for continuity of policy, and has kept India out of the arena of party strife in England. Authority, power, prestige are all summed up in the word Ikbál. That is the word on which the astonishing miracle — the rule of 300,000,000 by a mere handful of men — rests. Justice, benevolence, an almost missionary zeal to improve the condition of the people are mere incidental attributes. The student will be staggered when he learns the number of religions, languages, tribes and castes which exist in India. He will recognize that India is a vast conglomeration of innumerable differences. But he must see the people before he can realize the gulf which lies between the Sikh and Pathan, the Mahratta and the Bengali. Lord Curzon explained it in his speech at the Guild-Hall in 1904: «We have to deal in India with races that are as different from each other as the Esquimau is from the Spaniard or the Irishman from the Turk; with creeds that range between the extreme points of the barest animalism on the one hand and the most exalted metaphysics on the other, and with standards of life that cover the whole space between barbarism and civilization."

It is no easy task to give equal justice to all these varieties of the human race, but the task is fairly faced, and the wise rule of religious tolerance, and the scrupulous respect which is paid to Indian customs, make possible the government of India. But though the differences are great there are solvent forces at work which may at no very distant date make for homogeneity in certain localities, and the close of one century and the beginning of another seems by some curious reason to be the signal for change. Some years ago it was the fashion to suppose that the people of the two great religions of India — the Hindus and the Mussulmans — would never work in harmony. It was similarly supposed that the manly races of the Punjab would never co-operate with the unwarlike people of lower Bengal. Undoubtedly many of the propositions which used to be accepted without challenge must be modified. Railways, travel in Europe, education and a free press have worked important changes, and it is plain that the government of the future will have to reckon not with an homogeneous India, but with an increasing number of educated Indians scattered over the continent who are groping after ideals. It will be the problem of the Indian statesman to find them these ideals, and to give them some safe scope for their activities. The progressive Indian realizes that India depends on the British connection. He wishes to take part in the government of India, and to enable India to take her place among the self-respecting nations of the world. But the progressive Indian — like the ordinary Englishman — will not grasp the radical point, that there is no India and no nation of Indians. If political power is to come to the educated classes — the microscopic minority of the millions, it must first come from small beginnings, from the village and the town. They cannot jump at once into the control of an empire. The progressive Indian is, so far as he can be judged by his conversation and his public speeches, loyal to the Crown, but unfortunately his organ — practically the whole of the native press — is undoubtedly preaching sedition and poisoning the mind of the rising generation against the government. Yet the leaders of the Progressive party would deplore a conflagration, for they and theirs would be the first to be overwhelmed. It needed no prophet to point out as did Mountstuart Elpinstone years ago that bureaucracy and a free press were incompatible, but the problems of finding the ideal for the intellect of India must be grappled with and the good humored indifference of a strong government toward a virulent and hostile press is no longer safe. This somewhat lengthy but still incomplete preface to the subject of "Foreign Policy in India" is necessary since it is impossible to deal with the Foreign Policy of India as a thing separate and apart from India. Up to the end of the 19th century Indian foreign policy was treated with great reticence. There may have been some policy, but it was known to few. But at the beginning of the present century Lord Curzon, Viceroy of India, who believed in taking the people into his confidence, departed from the old-fashioned reticence, and in several memorable speeches formulated the problems of the defence of India. No one was ever more qualified to expound these problems. He had made them his life study, and his intimate knowledge of the countries beyond the frontier, acquired by travel, coupled with his wonderful grasp of every detail of Indian affairs, enabled him to co-ordinate isolated facts and events, and to establish India's position on the board of British foreign policy. He pointed out that up to recent years the foreign relations of India were practically confined to her dealings with Afghanistan and to the designs or movements of the great Power beyond, and the Foreign Policy of India had little to do with any other foreign nation. "Now all that is changed and events are passing which are gradually drawing this country, once so isolated and remote, into the vortex of the world's policy, and that will materially affect its future." Consolidation on the frontiers involved more direct relations with the countries beyond, but more than that. "Europe has wakened up, and is beginning to take a revived interest in Asia. Russia with her vast territories, her great ambitions, and her unarrested advance, has been the pioneer in this movement, and with her or after her have come her competitors, rivals and allies. Thus, as all those foreigners arrive upon the scene and push forward into the vacant spots, we are slowly having a European situation recreated in Asia, with the same figures upon the stage. The great European Powers are also becoming the great Asiatic Powers. Already we have Great Britain, Russia, France, Germany and Turkey; and then, in place of all the smaller European kingdoms, and principalities, we have the empires and states of the east — Japan, China, Tibet, Siam, Afghanistan, Persia,— only a few of them strong and robust, the majority containing the seeds of inevitable decay. There lie in these events and in this renewed contact or collision, as the case may be, between the East and the West, omens of the greatest significance to this country." Again, "A land frontier 5,700 miles in length, peopled by hundreds of different tribes, most of them inured to religious fanaticism and hereditary rapine,— a single outbreak at a single point may set entire sections of that frontier ablaze. Then, beyond it, we are brought into direct contact with the picturesque but perilous debility of independent, or quasi-independent, Asiatic states, some of them incurably diseased and hastening to their fall; and behind them, again, are the muffled figures of great European Powers, advancing nearer and nearer and sometimes finding in these conditions temptations to action that is not in strict accordance with the interests which we are bound to defend."

But after all English foreign policy in India is largely a matter of finance, for it must be based on the contentment of the people. It can be asserted with deliberation that the system of taxation in India is fair and considerate, but there are millions who live on a very slender margin. In normal years when the rains are favorable there is plenty in the land; but when the rain fails, and when, later, famine is declared, the numbers who flock to the famine camps are proof that among the poorer classes there is little or no reserve. It is, therefore, incumbent on the Viceroy — whose duty is to keep India safe and contented — to ensure peace on his long land frontier of 5,700 miles. He can engage in no policy of adventure and he cannot lightly undertake even a small expedition, for he never knows whether a local disturbance may not set the frontier in a blaze for hundreds of miles. He has to consider the revenues and the economic requirements of India, the policing of the provinces, and the obligatory garrisons, and he knows that if his calculations are correct that he has only a certain amount of force for the extended defence of the Indian Empire. Those fierce critics of government — the editors of the native press — who write at the safe harbors where shots have not been fired for generations, maintain that the military forces of India are excessive, and they point with some justice to the fact that during the war in South Africa and the operations in China the garrison of India was seriously depleted. It was a risk, but no Viceroy can hesitate when the British Empire calls, and the splendid conduct of the people and princes of India justified the confidence reposed in them. The army of India is composed of British and native troops. Experience demands that the proportion shall be one British soldier to two Indian sepoys, and that the artillery shall be entirely British. The British soldier in India is expensive, the Indian sepoy cheap, perhaps the cheapest and for his pay the best and most efficient soldier in the world. On the frontier Lord Curzon, chiefly from political reasons,— the policy of conciliation instead of exasperation,— offered to the wild youth of the frontier service in militia regiments, while many of the greater princes have voluntarily contributed highly trained troops for the defence of the empire. These forces are trained by British officers, and have won high praise on service. But in spite of India's resources in man power, in spite of the loyal co-operation of the great Feudatories, the Indian government cannot be expected, single-handed, to provide for the defence of what has been truly called the «strategical frontier» of the British Empire. India must look to Great Britain in times of supreme danger, and in the matter of foreign policy India is merely an agent of the British government. The Viceroy and his government are responsible as local agents for Indian territory where it marches with Turkey, Russia, China and France, for the Persian Gulf, and for relations with Afghanistan. It is always difficult for men who have been brought up in a school of great tradition to abandon the faith, and among the traditions which have made this splendid Indian Empire have been courage, a belief in the British mission in the East, and undaunted advance. (For *Bibliography* see India, Burma, Afghanistan, etc.).

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49. BRITISH FOREIGN POLICY IN AFRICA AND AMERICA. At the outbreak of the European War the British possessions in Africa amounted to a total of 2,100,000 square miles. On 5 Nov. 1914 Great Britain declared war on Turkey, and on 17 December the Turkish suzerainty over Egypt was ended. By this stroke Great Britain annexed Egypt, the Sudan and the Libyan desert, adding a matter of 1,600,000 square miles to the British empire. These three territories, though administered by England since 1882 in the case of Egypt and 1898 in that of the Sudan, had never been British possessions. They stood under Turkish suzerainty with a native prince (khedive) as ruler, assisted by a staff of British officials. France owns 3,866,950 square miles of Africa, but of this at least 1,500,000 square miles is her share of the great Sahara Desert. Great Britain, on the other hand, holds 3,701,411 square miles, most of it situated in the choicest regions of the Dark Continent. The German African colonies captured by the Allies during the war are not considered here.

Leaving out of account the Gold Coast (80,000 square miles), Sierra Leone (31,000 square miles) and Gambia (4,500 square miles), all situated on the West Coast and ceded to England by treaties in 1672, 1787 and 1807 respectively, it has taken Great Britain exactly 100 years to create her gigantic African empire — from the Treaty of Paris in 1814 to December 1914. With the signing of that treaty, by which also British Guiana was ceded to her, Great Britain completed the structure of her dominions on and about the American Continents — Canada, West Indies, Falklands, etc.

To return to Africa. It is customary at the erection of all stately edifices to lay first a foundation and then to proceed with the superstructure according to some well-defined plan, design or policy. A study of British policy in Africa cannot but lead the student to the conclusion that policy — in the sense of «design» — is an almost negligible quantity. This assertion, however, may not apply so strictly to more recent years. It seems rather that a concatenation of fortuitous circumstances led or drove Great Britain into acquiring or annexing huge territories than that there existed any inherent desire to do so. Over and over again we find successive governments hesitating — almost trembling — on the brink of some colonial adventure; a desire to «cut and run,» and finally pushed by events or individuals into the very act they dreaded and hoped to avoid. India was conquered by a private trading company; Canada dropped into England's lap as the result of one battle; and Australia became British mainly because no one else came along to pick it up; the North American Colonies were established by private enterprise and lost again only through government bungling. The position of Great Britain in Egypt to-day is due simply to the defection of France in 1882. Both nations — at the instigation of France — sent warships to Alexandria with the object of crushing the Arabi Pasha rebellion and of restoring the authority of the Khedive Tewfik Pasha. At the eleventh hour France backed out and left the British fleet to carry out the task alone. British troops crushed the revolt and England was left to face the alternatives of either leaving the country in a state of chaos or remaining to set its affairs — especially the finances — in order. Only six years before England had become the chief proprietor of the Suez Canal by the purchase of the khedive's shares for $20,000,000. This master stroke, again, was due to private initiative, and not to any intention on part of the government. The late Frederick Greenwood, editor of the London *Pall Mall Gazette*, was the man who worried Lord Derby and Lord Beaconsfield to such an extent that the latter sent his secretary late at night to ask Lord Rothschild to advance the money, and next morning the shares were British property. The armed intervention in 1882 was due in a large measure to the correspondence of the late Mr. C. F. Moberly Bell (q.v.), then *Times* representative in Egypt. In both these far-reaching events the government was unwillingly prodded into activity by private individuals. In South Africa, again, we observe the gigantic figure of Cecil Rhodes, the founder of Rhodesia, the man who, without any official sanction, dreamed the vision of «all British, from Cairo to the Cape.» With the aid of his able lieutenant, Dr. Jameson, he organized and financed the so-called «Jameson Raid» into the South African Republic in 1895. Four years later this ill-starred exploit brought on the Boer War, in which it took Great Britain nearly three years and 250,000 men to achieve what Rhodes and Jameson hoped to accomplish in a few days with 500 men. After the Majuba Hill disaster of 1881 the British government accepted defeat and «scuttled» in alarm, thereby laying up a store of future trouble that was not ended till 21 years later by the Peace of Vereeniging. Great Britain had fought expensive wars against the Kaffirs to save the whites from extinction in 1811, 1818, 1829, 1835, 1846, 1851 and the Zulu War of 1879. She also fought the Matabeles and Bechuanas, instilled respect for the white man among the natives, and consummated her civilizing mission by insuring political stability and peace in that part of the world with the Union of South Africa in 1910. Here, as well as in the Sudan and on the Slave Coast, where the hand of Great Britain once fell heavily, inflicting painful wounds, that same hand has also known how to heal and uplift after the drastic ordeal of correction. The Mahdi and Khalifa horrors of the Sudan were swept away in two days by fire and sword; in the city where Gordon fell there is now a university for the people; the human sacrifices and blood orgies of Benin and the slavery atrocities of Ashantee are now things of the past: peace and industries now reign in their stead.

Already in 1807 negro slavery had been abolished in England; in 1833 it was abolished in all British colonies; in 1843, 12,000,000 slaves were liberated in India; directly after Great Britain assumed a protectorate over Zanzibar in 1890 slavery died out; in 1895 the practise was abolished in Egypt, formerly a great African slave market. As the late Professor David Ames Wells wrote in 1896, «when England has once put down savagery, that rendered civilization impossible, her treatment of the subjugated and uncivilized has always been merciful.» That by this process of civilizing and subjugating, by administering law and government in «protectorates,» Great Britain eventually became the possessor of those territories, was an automatic and inevitable logical conclusion. She had either to hold them or cast them adrift to wander under the control of some other power.

In East and Central Africa British policy may be described as an «engineering policy.» The Uganda Railway from Mombasa to Port Florence on the Victoria Nyanza; the Cape to Cairo Railway; the huge bridge over the Victoria Falls; the construction of roads and trade routes, buildings and wharves; the development of Nyassaland and, in the West, of Nigeria, are all costly and strenuous undertakings from which not only Africa, but the whole world must derive incalculable advantage in the future. A thousand-mile trip down the Nile or a seven-hundred mile journey from the Indian Ocean inland on British territory can to-day be made with as much ease and comfort as a railroad journey from New York to Chicago.

It now remains to examine briefly the trend of Great Britain's policy in a part of Africa which is not in her possession, namely, Morocco. The international controversy over that country is of recent date, and undoubtedly played a prominent part in the overture to the European War of 1914. But Morocco was merely a pawn on the European diplomatic chess board. In March 1905 the German emperor landed at Tangier to aid the sultan in his demand for a conference of the Powers to check the military dispositions of France, which, by the Anglo-French agreement of 1904, was allowed a free hand in Morocco in return for the same privilege being accorded to Great Britain in Egypt. Germany complained that she had not been consulted in the matter and demanded certain concessions or, alternatively, compensation elsewhere. (See MOROCCO). Germany's object in raising the dispute was mainly to test the strength of the new-born «Entente Cordiale» between France and Great Britain and to separate them if possible while Russia had her hands full with the Japanese War. But both at the Algeciras conference in 1906 and during the Morocco crisis of 1911 Great Britain and France held firmly together, supported even by Italy the ally of Germany and Austria. Up to this time British policy in Africa had not been antagonistic to the acquisition of territory by Germany on that continent; but the unrelenting opposition now offered to German claims in Morocco was based on the strong ground of self-preservation. British statesmen had for some years realized that, with the rapid growth of her navy, Germany had become an implacable and jealous enemy of the British Empire. Already in 1902 Germany had entered into negotiations with France to obtain a harbor on the coast of Morocco; had the attempt proved successful it would have meant a deadly blow at British sea power. A German fleet stationed off Morocco would have controlled not only the route to the Cape, but also the Strait of Gibraltar, thereby cutting off communications with Egypt and India. In addition, it would have rendered at least difficult — if not impossible — any co-operation between the British North Sea and Atlantic squadrons and those stationed in Southern and Eastern waters. It was no doubt a similar apprehension that prompted Great Britain to retain possession of Walfish Bay, situated on the coast of German Southwest Africa. The German government had on several occasions endeavored to acquire the harbor, a proposal consistently vetoed by Cape Colony.

British policy in America, in so far as there can be said to be any, is one of passivity. Canada conducts her own affairs without interference from the mother country; the West Indian islands have their governors and local parliaments, managing their domestic affairs in a manner suitable to themselves. The same may be said of British Guiana and the Falkland Islands. These outlying posts of the empire are seldom heard of; they create neither disturbance nor sensations, keeping «the noiseless tenor of their way.»

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50. THE FREE TRADE MOVEMENT.

Introduction.— The British are Free Traders and hold it vital to their interests to maintain Free Trade. They do not, of course, mean that the government ought never to take any toll from traders or lay any taxation whatever upon imported goods. In a modern state it would be absolutely impossible to support any such contention. The enormous revenues which have to be raised to carry on the work of government make indirect taxation an absolute necessity. The principle upon which the British Free Trader insists is that any tariff imposed upon goods entering his country shall be imposed for revenue purposes only. That he holds is the sole object which the government must entertain in levying its customs. But it follows from this that duties ought not to be levied at the ports on goods produced abroad which are also produced in England. To levy such duties encourages the consumer to buy the home and untaxed goods rather than the foreign and taxed goods, and so diminishes the yield of the tax. Needless to say, this principle is not adopted out of any hostility to home-made products, or from any desire to favor the foreigner. If he thought he could do so without injury to himself, without loss of revenue or without diminishing trade generally, the Englishman would of course prefer that the goods made by his fellow-citizens should sell better than those made by foreigners. One of his objections to protective duties (that is, to import duties on articles which are also made at home) is that such duties are not good «drawing» taxes. Unless the state levies excise duties equal in amount to the customs duties, and such excise duties can only be levied profitably in a few instances, the home manufactured goods which escape taxation are, speaking in a strictly fiscal sense, defrauding the revenue. In other words, what ought to go into the public purse is going into the pockets of the protected manufacturers. The more efficiently a tax protects, the worse tax it is for the purpose of filling the treasury — the true purpose of all taxation. It is then, in the opinion of English Free Traders, neither wise nor in the true interests of the state to interfere with the course of trade on any other ground than that of producing revenue.

The Economic Argument.— It must next be explained that the Free Trade Englishman objects to interference with the course of trade, not out of any pedantic feeling in regard to the abstract «rights» of the trading part of the community, but because he believes that such interference must involve economic waste and so cause material loss to the nation. He believes that to forbid or interfere with exchanges between man and man always results in a diminution of national wealth. The English have adopted during the past 50 years and more, the principle that all exchanges are and must be a *mutual* benefit. They are transactions which are twice blest. They bless him that buys as well as him that sells, and benefit the man who exchanges gold for corn as much as the man who gives corn for gold. Hence it has become an essential, nay, an almost instinctive, belief on the part of the great majority of Englishmen that it is to their interest to stimulate and encourage exchanges in every possible way. They hold that to reduce the volume of exchanges must necessarily cause waste. But government interference with trade by means of customs duties is bound to reduce the number of exchanges. Therefore they will only allow that interference in obedience to the imperative needs of the treasury. They realize that foreign exchanges benefit the individuals of a nation, and so the nation, quite as much as home exchanges, and feel that as long as exchanges are being made freely and are increasing, that there can be nothing wrong, at any rate in the commercial condition of a nation. Only allow free commercial intercourse, free buying and free selling and free access to the ports of a country, and its trade, and so its prosperity, will take care of itself. To allow the maximum of exchanges is to increase the wealth of a nation. To prevent or lessen exchanges is to waste its wealth.

The «Bleeding to Death» Hypothesis.— Further, English Free Traders hold that there is no necessity to be anxious as to whether the imports into a country are greater in value than the exports out of it. They hold that the relations between the imports and exports must necessarily adjust and equalize themselves. Human nature, they contend, has passed an ordinance to the effect that «he that will not buy, neither shall he sell.» Thus, instead of fearing that imports, even of goods which can be made in England, will reduce the amount of labor, and so injure home trade, they regard all imports into Britain as orders for British goods to be produced and paid in exchange for those imports. Imports are physical orders for goods, and so for the labor that is employed to make the goods. And they have this advantage: the payment arrives with the order.

At one time the general British public, it must be admitted, was not so confident as it is now in regard to the propositions just set forth. The opponents of Free Trade declared that Englishmen were living in a fool's paradise when they supposed that trade could look after itself, and that imports and exports must really be balancing though the statistics *seemed* to show that many millions' worth more goods came into England every year than went out of it. Nobody, they argued, will give something for nothing, and therefore if your imports exceed your exports by, say, a hundred millions a year, you must be paying the difference in some way or other. «There is only one way in which you can be paying it,» ran the argument, «and that is by sending away the capital accumulated in years of better trade. In fact you are living on your capital and bleeding to death. Because you have been very rich in the past, the process may take a long time to work out, but some day you will find that you have no more blood left in your veins, and that you have reached the point of economic extinction." That line of argument was first used in the "Fair Trade" agitation in the years 1882–1885, and was revived in 1903. The simplest answer is found in the fact that if exchanges do not balance and if the British people have been in truth living on their capital and bleeding to death, they ought by now to be a trebly ruined nation. In the course of the last 35 years imports have *apparently* been so much in excess of exports that the loss in that period must have been nearly £2,000,000,000 of capital. But it is notorious that we have suffered no such loss. Though statistics as regards the accumulation of capital, both in home and foreign investments, are by no means complete or satisfactory, it is manifest that instead of bleeding to death the nation has become more, not less, full blooded from the capitalist point of view and that the total capital, instead of diminishing, has vastly increased in the course of the last quarter of a century. Instead of having £2,000,000,000 less capital, we have many hundreds of millions more and are a very much richer people. In other words, experience has shown that the bleeding to death theory will not bear examination, and that whether on other grounds or not protection may be a good thing, free trade is certainly not driving Britain to bankruptcy or reducing her capital resources. In fact, regarded as a means for increasing and maintaining the material wealth of the nation, Free Trade must be admitted to hold the field.

The Imperial Argument.— Though there is no doubt a great deal of difference of opinion in regard to the best way in which to maintain and develop the British Empire, the nation is virtually unanimous on one point. It is for the benefit — moral, political and economic — of the peoples who compose it that the British Empire shall be maintained. It is asserted on the Protectionist side, however, that the Empire cannot be maintained under a Free Trade system, and that unless that system is changed the Empire will fall. That argument has hitherto not made any impression upon the masses of the British people. Instead of accepting the formula "No Preference, no Empire" they are much more inclined to accept the opposite dictum, "No Free Trade, no Empire" and to hold the opinion that the Empire as it exists to-day is the gift of Free Trade. Up to 70 years ago there was a system of preferential trade within the Empire almost exactly like that which it is now proposed to re-establish. On the one hand the British colonies were required to give a preference to British manufactured goods and to supply their needs in the British market, and on the other, the British people gave a very large advantage to the products of the various parts of the British Empire in their markets. Yet, strange as it may seem, the result of these attempts to interfere with exchanges on political grounds did not produce a greater sense of loyalty in the inhabitants of the colonies or of better feeling toward the scattered parts of the empire in the United Kingdom. The epoch of colonial preference was the epoch in which there grew up in England a school of thought and a political party which believed that the connection between the outlying parts of the empire and the United Kingdom was injurious to both and that it would be to her advantage if Britain got rid of her colonies and dependencies as rapidly as possible. Even so imperialistic a statesman as Lord Beaconsfield was affected by these views in middle life. He actually described the colonies as "millstones round our neck" and looked forward to the time when they would all be independent. The abolition of colonial preference and the adoption of the principle of "tariff for revenue only" may be said to have been accomplished by the end of the first half of the 19th century. It was after 1850 and so in the Free Trade epoch that the strong sentiment in regard to the empire now existing, both in the colonies and at home grew up. No one now looks forward, as men constantly looked forward during the preferential epoch, to the time when the colonies would one by one leave the empire. This being so, many of the most far-seeing and the most steadfast imperialists in England regard Free Trade as essential to the maintenance of the empire.

A further argument for Free Trade as an essential condition of empire is to be found in the fact that from the strategic and military point of view the Empire rests upon sea power, and that sea power in the true sense cannot be possessed by a nation which does not also possess supremacy or something approaching supremacy in the matter of its mercantile marine. A great national navy depends upon a great commercial navy. But a commercial navy cannot exist without Free Trade. It is the nations which encourage all who have anything to sell to come freely to their ports and sell it there without let or hindrance, which most easily develop a large mercantile marine. Britain stands first in the world of shipping, not because she has better resources for shipbuilding and not because her population is by nature more inclined to sea-faring than others, but because she is a Free Trade nation. Englishmen feel that if they are to keep their empire they must remain a great shipping power, and to be a great shipping power they must maintain Free Trade.

Monopoly and Corruption.— There are two other factors which operate to make Englishmen maintain their present fiscal system. The first is the dread of monopoly which is to be found in the British democracy. They are intensely suspicious of anything in the nature of Trusts or Combines, or of allowing any body of commercial men to be in a position in which they can say "You must either buy the goods we make, or accept the services which we offer, or go without." Dreading intensely the creation of monopolies, they cling to Free Trade, for they realize that it is almost impossible to establish a complete monopoly under their present system. As long as the doors are open and the traders of every nation in the world are allowed to send what they will to Britain and dispose of it there freely, the task of creating a monopoly in any of the essential needs of mankind is almost impossible of accomplishment. Another reason which weighs not less strongly with the British nation is the dread of political corruption. Rightly or wrongly they believe that there is always a danger under Protection of corruption entering political life. It must not be inferred that the British people consider that a proper regard for national interests can never be found in protectionist states. The history of America shows that plenty of unselfish patriotism is to be found in countries where protection prevails. The fact, however, remains that the British people do dread very greatly the introduction of protectionist conditions into their political life. Further, they dread the direct corruption of the Legislature by the great commercial interests. They may trust their Members of Parliament in the abstract but they do not wish to see them exposed to the temptations which unquestionably exist when enormous pecuniary interests depend upon the maintenance of a Protectionist tariff. Hence, the British democracy feel that with the maintenance of Free Trade is bound up a great deal of what they value most in the political system under which they live. See THE BRITISH TARIFF MOVEMENT.

Bibliography.— The main outlines of the early free trade movement can be found in general histories, such as 'The Growth of English Industry and Commerce,' vol. II, by W. Cunningham; 'History of British Commerce,' by Leon Levi. But the real relation of the movement to English life and progress is best seen in the speeches of the politicians mainly responsible for the carrying out of ideas into practise. There is ample material of this kind in the 'Speeches' of W. Huskisson (1831); of Sir Robert Peel (1853); in the 'Free Trade Speeches' of Charles Villiers (1883); in the 'Life and Speeches of John Bright,' by G. B. Smith (1881); and in the 'Life of Richard Cobden,' by J. Morley (1881); the 'History of the Anti-Corn-Law League,' by H. Prentice (1853), and the 'History of the Free Trade Movement in England,' by A. Mongredien, also contain much information as to the earlier period.

Later Works.—'Free Trade and Protection,' by H. Fawcett (1878); and 'Free Trade v. Fair Trade,' by Sir T. Farrer (1885); 'The Free Trade Movement and its Results,' by G. Armitage-Smith (1903); 'Elements of the Fiscal Problem,' by L. G. Chiozza Money (1903); 'The Tariff Problem,' by W. J. Ashley (1903); 'The Rise and Decline of the Free Trade Movement,' by W. Cunningham (1903); 'The Return to Protection,' by W. Smart (1903); 'Fundamental Fallacies of Free Trade,' by L. S. Amery (1908); an interesting general view by a disinterested observer is given in C. J. Fuchs' 'The Trade Policy of Great Britain and Her Colonies,' translated by H. M. Archibald (1905).

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51. THE BRITISH TARIFF MOVEMENT: ITS ORIGIN, THEORY AND PROSPECTS. «For more penetrating observers,» writes Dr. Schulze-Galvernitz in his able study of the British economic situation, «the overwhelming success of the Liberals in the elections of January 1906, was less surprising than the number of votes given against Free Trade.» This is the verdict of the searching and candid writer whose prepossessions are all in favor of Free Trade. The remark shows a genuine anatomical knowledge of British politics and may be commended to Americans who wish to penetrate surface impressions on this subject and desire to grasp the underlying facts. My purpose, so far as the brief space permits, is to state the facts, to explain their causes and to indicate what seems to be their tendency.

The main fact is that England has ceased to be a solidly Free Trade nation. In the General Election of 1906 the Unionists, or Fiscal Reformers, were reduced in the House of Commons to an unprecedented minority. In Great Britain they secured less than a quarter of the seats; but the important point was that they obtained nearly 44 per cent. of the National vote. The balance of opinion disclosed at the polls may be shown in round numbers as follows:

BRITISH NATIONAL VOTING JANUARY 1906.

			Per cent.
For Liberals (Free Traders)	2,600,000	or	48.2
For Unionists (Fiscal Reformers)	2,350,000	or	43.5
For Labor Party (Independents)	450,000	or	8.3
	5,400,000		

The aggregate Liberal (Free Trade) vote was less than 50 per cent. of the whole, though the pendulum was swinging with very exceptional violence against the previous government for reasons largely unconnected with the Free Trade issue.

The Unionist, or Fiscal Reform party, secured at the first trial of strength, within less than three years from the beginning of Mr. Chamberlain's tariff campaign, the support of more than two-fifths of the nation. This is the surprising fact, as Professor Schulze-Galvernitz perceives. Seventy years after Adam Smith's 'Wealth of Nations' had appeared; nearly a quarter of a century after Huskinson had commenced to reduce the obsolete tariffs raised to an exorbitant height by the desperate revenue necessities of the Napoleonic wars; seven years after Cobden had started his violent and masterly agitation against the corn duties, the country was still unconverted to the Free Trade principle. It was suddenly moved to throw open its ports by the Irish famine and the crop failure of a disastrous season. «It was the rain,» as Mr. John Morley remarks, «that rained away the Corn Laws in 1846.»

The predominant fact of recent English politics is the rise of the tariff movement. The history of this fact may be briefly sketched. Its origins were slow and subconscious. Mr. Cobden had always dwelt upon the advantage of an unfettered exchange of cotton for corn. England would manufacture the cotton and other things; America and other countries would grow the corn; there would be an ideal division of labor from the British point of view. Mr. Cobden promised that if England abolished her tariffs there would not be a country in the world within five years but would have followed her example. Seventy years have elapsed; no country has followed her example. A steady rise of national tariffs, as elaborate and powerful as the fortifications of Vauban, has dominated the intervening period. The Far East has followed the example of the United States and the European Continent. Great Britain is only one open island amid the closing markets of the world. Free Trade, therefore — exchange equally unrestricted on one side and the other as between two nations transacting — has never yet prevailed anywhere. It is an unknown condition. Even England has not had it. She has instead the system of free imports by which foreign competition is admitted without interference to her market, while her own competition is as far as possible suppressed in foreign markets. That is not a satisfactory comparison.

Foreign protective tariffs are a disadvantage to British trade. British free imports are relatively an advantage to foreign trade. The conditions are unequal. Unequal conditions in commerce are not good. Free Trade writers simply restate, without modification of any kind, the traditional arguments which would apply to a genuine international system of free exchange, but cannot apply in the same measure — and, to a large extent, do not apply at all — to the state of things prevailing in the total absence of that system.

For a prolonged period (1846–75), British trade expanded with unexampled energy. Agriculture flourished. The economic conditions of the world were transformed by the Californian and Australian gold discoveries; by railway construction in the United States and upon the European Continent; by steam shipping. But America and Europe alike were convulsed by great wars. England had remained at peace and her workshops dominated all markets. But her memorable period of uncontested supremacy was over.

In 1878 — exactly a generation after Mr. Cobden's triumph — a period of commercial depression reached its depth. Crowds of industrial workers were unemployed in the cities. The old prosperity of British agriculture was broken and the rural population began rapidly to diminish. From that moment through another quarter of a century of trade fluctuations, the truth of the free import theory was questioned by an increasing number of English thinkers. Popular distrust, however, preceded scientific opposition. The «National Fair Trade League» was started in July 1881 and carried on for more than a decade a formidable political agitation, stimulated by some able controversial literature and a vigorous weekly paper. This protectionist movement, however, failed to find a great leader and died out in the early nineties. Its only chance of success lay in converting one of the great political parties. The Conservative rank and file were generally predisposed to protection. The Conservative leaders patronized the Fair Trade movement while the Liberals were in power, and stifled it when they had obtained office themselves. Nevertheless, other influences continued almost imperceptibly to dissolve Free Trade conviction throughout the country. The British *Trade Consular Reports* became a serial narrative of the advance of protectionist competition, American and German, in markets where British manufactured exports had recently been supreme. The immense progress of the United States and the new German Empire showed at last that free imports, or half-free trade, was not a certain recipe, assuredly not the sole recipe, for commercial success, and that protection was not necessarily a prevention of progress. There was a general mood of profound anxiety as to the position and prospects of British commerce and a widespread scepticism as to the theoretical truth of Free Trade and the practical advantage of free imports.

All the previous scepticism and mistrust which had existed upon the question of Free Trade were crystallized in 1903 when Mr. Chamberlain created the new fiscal reform movement. His Birmingham speech on May 15 in that year was one of the dominating events of English politics. In the limits of this article it is impossible to trace the history of his agitation. The result has been noticed. There has been a small schism of very distinguished persons. But the Unionist (or «Conservative» or «Imperialist») party is committed to some form of tariff policy. The Liberal-Irish Nationalist-Independent Labor Coalition is not morally solid against the tariff. England has ceased as a whole to be a Free Trade nation though still containing a great free trade party whose parliamentary predominance rests upon a comparatively slight majority of popular votes.

We now pass from the history to the theory of the movement. Free Traders say: (a) *that tariffs restrict trade.* The reply is that exports and imports alike are increasing in every considerable protectionist country. Germany's break with the Cobdenite system in 1879 — America's adoption of what Englishmen call McKinleyism — have been followed not by commercial restriction, but by a greater expansion of production, foreign exchanges, employment, population and wealth than has taken place in Great Britain during the parallel period. No Free Trade writers grapple with the fact — few ever notice the fact — that the fundamental principle of a scientific tariff is the free importation of raw material, side by side with the taxation of foreign competitive manufacture. The tariff idea aims at restricting the least advantageous kind of imports in order to develop the most profitable kind. So far from implying restricted trade, it means, when competently adjusted, the largest volume of the best exchanges. (b) *That imports must be balanced by exports — that goods received must be paid for by goods returned — and that as all international exchange will arrange itself in an ideal manner, if you let it alone, the State ought not to interfere with it.* The reply to these statements is that they are to a large extent altogether inaccurate and for the rest are superficial half-truths of a singularly deceptive character. Imports may or may not be completely paid for by exports (including shipping freights and foreign investments). The account may be cancelled by the transfer of securities. An excess of imports may remain as invested capital, the interest only being returned and the complete «balancing» being indefinitely deferred. England, for instance, formerly sent a steady excess of imports into the United States. The excess remained for the most part as British capital invested in America. America ceasing to be a debtor nation has cancelled a good deal of that British capital by the excess of her own exports in recent years. Thus while imports and exports may appear to balance more or less all the time, according to the conventional Free Trade theory, a movement may be gradually going on under the surface which actually reverses the position of the two countries concerned; and transfers the commanding advantage of economic relations from one country to another. Again, no Free Trader asserts that like is paid for by like — that the import of foreign *manufacture* produces an equivalent export of home *manufacture*. A country which formerly exported raw produce in exchange for finished manufacture may rise in the social scale and export in its turn finished goods to pay for crude material. So far as the maxim tells upon the practical controversy, it tells both ways. Imports and exports do not balance better under free imports than under the tariff. America pays for her imports with her exports and has a probable margin to spare! America entrenches her own trade in its position and makes it as difficult as possible for foreign competition to displace it. The English system makes it as easy as possible for foreign manufacture to displace home industry. Under Free Trade the products of certain industries may pay for the competitive imports which are steadily weakening other industries. To sum up, the tendency of isolated free imports is to undermine the national defensive position in trade after trade. America and Germany under the tariff are making new conquests in trade after trade. «Where organization becomes necessary,» said Brunel, «*laissez faire* becomes impossible.»

The British tariff movement, however, laid more stress upon its constructive principles than upon its replies to the sophistry of Cobdenite syllogisms. It was maintained that the tariff under British conditions would mean the maximum increase and the best distribution of wealth. An isolated free import system implies the narrowest and least secure market. A competitive import only enters by displacing the home supply against which it had competed. There is a gain to some home consumers but a loss to some producers. The nominally counterbalancing export follows at the second remove, though meanwhile a net injury to the productive power of the importing country may have been inflicted. Home capital may have been sterilized; home labor displaced. Under the present conditions free imports actually restrict British industry to the smallest market and secure foreign competition in the possession of the largest market. America has free sale within her own market and ours, among 143,000,000 of people; Germany has free sale in her own territory and equally in the United Kingdom — a similar double-market of over 100,000,000 of people. England has no free sale for her goods outside her own home market of 45,000,000 of inhabitants, and does not reserve any advantage to herself even upon her own soil. The conditions are not equal; the inequality means a steady discount upon British national prosperity.

There is also a moral question rather unpleasantly introduced in a manner which can only be called a little insular. It is said that the tariff would introduce corruption. I do not believe it. In economic controversy it is especially desirable to «clear our minds of cant.» In spite of free imports, gross frauds are perpetrated in English finance and a considerable amount of petty dishonesty prevails in business. Human nature is tinctured in the ordinary way, and to revive the old pose of superior virtue is a proceeding which appears to be a little deficient in humor. Corruption in America, if I judge aright, is due to the concentrated passion of the money-hunt, to the vehemence of the desire to succeed, and the sheer difficulty of bringing public opinion steadily to bear upon any one aspect of this evil amid a heterogeneous society in a state of violent material development. Corruption rages in every phase of expansion and exploitation. The American habit of making public confession under a sounding board creates an exaggerated impression in Europe where the admitted evil is popularly believed to be far worse than it is. My aim has been to show that the tariff movement in England depends upon a theory of development, not of restriction; that the political prospects of that movement are good; and that the real strength of the foundation of the free-import system, national unanimity in support of it, has irrevocably disappeared.

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52. GREAT BRITAIN AND THE WORLD WAR. The participation of Great Britain in the World War, in August 1914, has been ascribed to causes so diverse that it seems advisable briefly to describe the chief events which brought it about, and to leave the reader to form his own conclusions. Geographical and commercial factors brought the German Empire, founded in 1871, into rivalry with Great Britain. The British Isles lie athwart the path of Germany to the Atlantic, and their emigrants had occupied large portions of the earth's surface long before the Germans acquired their first colonies (1884). Since that date Germany has annexed 1,123,078 square miles of colonial territory, or at the rate of more than 37,000 square miles a year, without incurring serious risk of war. Both Gladstone and Lord Salisbury approved her colonial expansion, which proceeded most rapidly in the years 1884–1900 when she possessed a very small navy. As the Free Trade policy of the United Kingdom and its dependencies favored the growth of Germany's commerce (even after 1879, when she began to penalize British imports), it is clear that the islanders were not actuated by jealousy of her commercial expansion.

That rapid expansion failed to satisfy the ambitions of Kaiser William II and his people. Their triumph over Austria in 1866 and France in 1870 fostered the belief that a more thorough preparation would ensure to them a far grander future, and they came to regard themselves as cooped in, while the easy-going British, the «decadent» French and the badly governed Russians had a disproportionate share of the earth's surface. These views were inculcated by the German Navy League, the Pan-German League and similar bodies. Party strifes in England and France and political corruption in Russia enfeebled these peoples, while the prestige and power of Germany steadily rose. She had secured the alliance of Austria in 1879, of Italy in 1882, of the King of Rumania in 1883, and an Entente with Turkey in 1898. Despite the Franco-Russian alliance of 1891–94, her position in Europe was supreme. In January 1896 William II announced *Weltpolitik* to be her paramount aim; and in 1898 he secured the passing of the first Navy Bill, which, during the fierce Anglophobia of the Boer War (1899–1902) was supplemented by a more ambitious Navy Bill (1900). The new German fleet was not ready until 1904, otherwise an Anglo-German conflict might have broken out during that war. In 1901–02 the British government sought to frame an alliance with Germany, as also with Japan, chiefly on questions in the Far East. The Berlin government repelled those advances; but Japan welcomed them and signed the treaty of 30 Jan. 1902, which ended the period of England's «splendid isolation.» Count Reventlow* and other German writers approved the rejection of British offers of friendship because the interests of the two empires were divergent, and Germany could not tie her hands by a treaty which might limit her colonial and naval efforts.

Already German aims were centred on the Near East. In November 1898, soon after Kitchener's victory over the Mahdists at Omdurman, William II visited Constantinople and Damascus, and at the tomb of Saladin, solemnly promised ever to befriend the «300,000,000 Moslems» of the world. In 1903 the results of the visit materialized in the plan of the Bagdad Railway, which assured to its German promoters large mining and other rights along its course. Together with its branch southwards to the Hedjaz and Mecca, it promised to assure Teutonic supremacy in Asia Minor, Mesopotamia, Syria and the Sinaitic Peninsula, besides facilitating military action against the Suez Canal and on the Persian Gulf. Dr. Paul Rohrbach declared, in a later edition of his book 'Die Bagdadbahn' (1911) that the railway would enable the Central Empires and Turkey to attack England in Egypt with every hope of success. We may note here the later utterances of German writers of repute. Professor Hettner, 'Die unsere Weltpolitik' (Berlin 1915), says «Such a policy [alliance with Turkey] opens the way to Egypt and Persia and through the Persian Gulf [where England's supremacy must be broken] to the Indian Empire and surrounding lands.» Dr. Freiherr von Mackay ('Der Vierbund,' Stuttgart 1916): «The foremost direction for the blow to be struck by the new Quadruple Alliance is known. Its point is defined in the phrase 'Ostend-Bagdad.' It is directed against Britain's supremacy of the seas and the chain of naval stations connecting the North Sea with India.» Professor Roloff ('Eine ægyptische Expedition,' Giessen 1915): «Even if the British escape catastrophe in Egypt, their occupation of that land will bring them little profit and less peace of mind if Turkey emerges from this war rejuvenated and strong.» Vela ('Die Zukunft der Türkei,' Leipzig 1915): «The motive which inspired the friendship with Turkey was identical with that which inspired the acquisition of Heligoland.» Even in 1903–04 Germany's Oriental policy aroused alarm in Great Britain and France. Possibly it prompted, certainly it facilitated, the conclusion of their Entente Cordiale in April 1904. The maintenance of their interests in the East was clearly more important than persistence in outworn jealousies respecting the Newfoundland fisheries, Siam, Egypt, etc. Thus, Germany's naval and Oriental policy produced what may be termed the Diplomatic Revolution of the 20th century, the two western powers burying the hatchet and becoming fast friends. The German government and press admitted that that Entente was not directed against Germany; but the Kaiser soon sought to dissolve it, e.g., by his melodramatic intervention in the Moroccan affair. (See MOROCCO, HISTORY). As his landing at Tangier and his declaration for the independence of the Sultan of Morocco occurred very soon after the Russian defeat at Mukden, he evidently sought to make capital out of the weakening of the Franco-Russian combination. The Morocco question became for a time a «Machtfrage» (trial of strength). Finally it was referred to a General Conference of the Powers at Algeciras (spring of 1906), at which Germany's highhanded action met with no support except from her «brilliant second,» Austria. Indeed, it helped on an Entente between those former rivals, Great Britain and Russia (August 1907); for they, no less than France, were threatened by the recent development of Austro-German policy in the East. Russia, after her defeat by Japan, was in a position of marked inferiority to the Central empires in respect to armaments. Great Britain and her new friends had also felt deep concern at the persistent refusal of Germany, and the general refusal of Austria to listen to proposals of arbitration and limitation of armaments put forward at the Peace Conferences held at the Hague in 1899 and in June 1907. The first Conference, held on the invitation of Tsar Nicholas II, had led to no definite result, owing chiefly to the opposition of Germany; but the other states, in general, agreed to the principle of those proposals and most of them have since framed treaties of arbitration. In the years 1906–07, Great Britain invited Germany to agree to a plan for limiting naval construction; but despite the retarding of the British naval program during the discussions, the Berlin government declined to restrict its program. Equally discouraging was its attitude at the second Hague Conference. Armament having dangerously increased since 1899, the representatives of nearly all the sovereign states there assembled again affirmed the need of limiting the growth of armies and navies. The Conference also extended the powers of the Permanent Court of Arbitration, established in 1899, but failed either to found a permanent Court of Arbitral Justice or to draft a general and uniform Arbitration Treaty which all states should pledge themselves to adopt. The chief opposition came from Germany and Austria. Germany also led the opposition to the British proposal prohibiting the use of drifting mines at sea. (For the attitude of her military and naval circles toward these conferences see the section entitled «Utopian und Intrigen im Haag» in Reventlow's work already named). Further efforts by the Cambpell-Bannerman Ministry in London to frame a friendly agreement with Germany met with failure and the British naval program of 1909 reflected the widespread alarm caused by the rapid growth of the German navy. That growth was accelerated by the German Navy Bill of April 1912 (coincident with a new Army Bill equally alarming to France and Russia) which provided that, by the year 1920, the German navy should consist of 41 battleships, 20 armored cruisers, 40 unarmed cruisers, 144 destroyers, and 71 submarines. This force, concentrated almost entirely in the North Sea and the Baltic, would constitute a serious threat both to Great Britain and Russia. Mr. Winston Churchill, First Lord of the Admiralty, had again proposed a «naval holiday»; but, his offer being declined, he pointed out in a memorandum to the Canadian government that in 1915 Great Britain would possess 25 dreadnoughts, 2 Lord Nelsons and six battle-cruisers, as against 17 dreadnoughts and six battle-cruisers for Germany; and the margin of safety would thereafter diminish for Great Britain. This ominous situation became darker owing to the failure of Lord Haldane (q.v.) during a visit to Berlin in the spring of 1912, to arrive at a friendly understanding with the German chancellor, except on terms which would bind Great Britain to absolute neutrality in nearly every conceivable case. Lord Haldane could not consent to tie Britain's hands in the rigid way demanded by the German government.

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*Reventlow, 'Deutschlands auswärtige Politik' (2d ed., pp. 178, 179.)

The haughty attitude of Germany in these questions and in others soon to be noted, caused the more concern because it reflected the forceful doctrines inculcated by Nietzsche, Treitschke and Bernhardi. Nietzsche in his philosophic extravaganzas scoffed at Christianity for teaching what he termed a «slave-morality»; whereas the «superman» would resolve to secure power over inferiors; and the new «magistral morality» would confer pre-eminence on the nation which aimed at the heroic life. Alexander the Great and Napolean the Great were his heroes; and his work, though non-political, popularized the idea of conquest over weaker peoples. Far more direct was the influence of Treitschke, whose lectures and writings in 1866-96 proclaimed the praises of the Prussia of Frederick the Great, Blücher and Bismarck. In turn Austria, France and England were his bugbears. Pointing to German triumphs and German efficiency, he bade his countrymen overthrow the modern Carthage: «Our last reckoning, that with England, will probably be the most tedious and the most difficult.» Then again he glorified war and scorned the «weary, spiritless and exhausted ages which have played with the dream of perpetual peace.» These teachings permeated German universities (and through them the schools) with a bellicose and Anglophobe spirit, which General von Bernhardi accentuated by his book 'Germany and the Next War' (October 1911). Scoffing at pacifists as visionaries, cowards or hypocrites, he bade Germany realize her true mission by war. «Might,» so he wrote, «is the supreme right; and the dispute as to what is right is decided by the arbitrament of war. War gives a biologically just decision.» Again,—«In certain circumstances it is not only the right but the moral and political duty of the statesman to bring about a war.» He regarded Germany's interests as fundamentally opposed to those of Great Britain, far less so to those of Russia, and he pronounced the Franco-Russian alliance as of doubtful solidity. «Therefore,» he wrote, «we must square our account with France if we wish for a free hand in our international policy. France must be so completely crushed that she can never again come across our path. . . . Even English attempts at a *rapprochement* [to Germany] must not blind us to the real situation. We may at most use them to delay the necessary and inevitable war until we may fairly imagine we have some prospect of success.» It is doubtful whether these views were held by the majority of the German people, even in 1914; but they provided the governing and influential classes (well organized in the Leagues above named) with a fighting creed which at the crisis prevailed over the vaguer and less exciting creed of the German Progressives. In Great Britain the definite triumph of the Liberals in the general elections of 1910 ensured a peaceful policy except in case of dire necessity.

Meanwhile the repose of Europe had been disturbed by crises in the Balkans and Morocco. In October 1908 Austria surprised the world by declaring that she annexed Bosnia, which she had occupied as the mandatory of Europe since 1878. Sir Edward Grey on behalf of Great Britain strongly protested against her action; so did France and Russia, likewise Serbia, which now lost her outlet seawards; but Germany stoutly supported Austria; and the Entente Powers and Serbia gave way (1909). In 1911 the internal crisis in Morocco became acute owing to the spread of anarchy; and when France took measures to protect the «special interests» which the Algeciras Convention recognized as hers by right in that land, Germany intervened by sending a cruiser to Agadir (July 1). Sharp tension ensued, especially after the declaration of Great Britain (4 July) that she must be consulted about any new arrangements in Morocco. This declaration Germany ignored. Accordingly, on 21 July, Mr. Lloyd George, Chancellor of the Exchequer, publicly stated that Great Britain would not allow herself to be treated as «of no account in the Cabinet of Nations.» These words aroused heated demands in Germany for war against Great Britain and France. The Berlin government, however, kept cool, bargained dexterously with France and by the treaty of 4 Nov. 1911 secured some 100,000 square miles of French Kongoland in return for recognition of the protectorate of France over Morocco and changes not unfavorable to German interests in that quarter. Again the German press indulged in orgies of Anglophobia and Gallophobia, which the Crown Prince publicly encouraged. Perhaps a rupture would then have occurred if German finance had not been in a critical state and if the enlarged Kiel-North Sea Canal had not still been uncompleted.

In the autumn of 1912 Turkish misrule in Macedonia brought Bulgaria, Serbia, Greece and Montenegro, to a secret agreement; and, failing to bend the Ottoman government, they encountered its hostility in the autumn. The League soon defeated Turkey, but disputes about the sharing of Macedonia and East Albania (fomented from Vienna) led to the fratricidal war of 1913, ending in the unsatisfactory treaty of Bucharest (10 Aug. 1913), which left all the Balkans divided and embittered. The following facts challenge attention (1) the hostility of Austria to Serbia's efforts to reach the Adriatic, both in 1908 and 1912; (2) the subservience of Bulgaria and of the young Turkish régime to the Central Empires; (3) the triumph of Austro-German policy, which aimed at the disruption of the Balkan League; (4) the comparative helplessness of the Entente Powers when opposed to the Central Empires, though these had but slight support from Italy (latterly engaged in a war with Turkey); (5) the certainty of further trouble in the Balkans owing to internal feuds and the southeastern thrust of the Central Empires, a thrust aimed primarily against Britain in Egypt but also threatening to the Asiatic interests of France and Russia. It is now known that in August 1913 Austria applied to Italy for help in a general attack by the Triple Alliance (Germany, Austria and Italy) on Serbia; but Italy refused to share in so wanton an act of aggression. Germany also seems to have dissuaded her overzealous ally, probably because German armaments and the Kiel Canal were not completed. In April–June 1913 the German Chancellor applied to the Reichstag for a new army bill, adding some 63,000 recruits a year and bringing the peace strength up to 870,000 men. A special finance bill of a very drastic kind was also introduced to meet the extra nonrecurring expense of nearly $265,000,000 and the extra annual cost of nearly $47,500,000, involved by the proposed changes. The War Minister added that Germany wanted peace, but "if war came, she wanted to win.— The best parry is the lunge; the best covering force is the offensive." Despite sharp opposition, both bills were passed. By midsummer 1914 the changes had taken effect; the military equipment was complete, and the Kiel Canal, then re-opened, was available for the largest battleships.

The murder of Archduke Francis Ferdinand, heir to the Austrian throne, by two Bosniac Serbs at Serajevo, on 28 June 1914, is wrapped in mystery. After a strangely long interval, Austria, on 23 July, accused Serbian officials of complicity in the crime and proffered demands incompatible with Serbia's independence. An acute crisis at once arose; for the Germans and Hungarians of the dual monarchy demanded war with Serbia, "the little brother," whom Russia, "the big brother," was in honor bound to protect. Faithful to the law-abiding and pacifist procedure adopted by him in 1908 and 1912–13, Grey at once proposed that Great Britain and France should moderate the actions likely to be taken by Russia, while Germany and Italy sought to assuage the anger of Austria. Thus only could a war be averted, first between Austria and Serbia, secondly between Russia and Austria, thirdly between Germany and Russia, fourthly between Germany and France, with danger of involving Belgium and Great Britain. The two systems of alliances or Ententes had helped to preserve peace in 1908 and 1913; but, if war began in any quarter, those alliances were likely to make it general — a consideration manifest to every statesman. The Austrian note of 25 July to the Austrian Ambassador at Petrograd indicated that, if Russia drew the sword on behalf of the Serbs, she would meet both Austria and Germany in arms. Von Tschirsky, German Ambassador at Vienna, stated that his government was "backing up" Austria; and this provocative attitude of the Central Empires was certain to embroil them with Russia and her ally, France. The German Chancellor, Bethmann-Hollweg, and the Foreign Minister, von Jagow, have declared that they always worked for peace. Certainly their attitude was more pacific than that of the Crown Prince, Tschirsky, and the Kaiser's military advisers. Possibly they all hoped to overawe Russia in 1908–09 and 1912–13. If so, they were playing with fire. The present crisis touched the honor of the Tsar more closely. He is reported to have said on 25 July, "We have stood this sort of thing for seven years; this is enough." France accepted Grey's proposal to seek to assuage Russia and Italy agreed to try and calm her ally, Austria; but on 28 July (the day after the return of Kaiser Wilhelm to Berlin from a yachting cruise) Germany refused to entertain Grey's proposal; and on that same day Austria declared war on Serbia. We may note here two facts: (1) Italy (conscious of Austria's aggressive designs on Serbia in 1913), soon declared that she would remain neutral in the war brought about by the provocative conduct of her allies; (2) Grey, on 25 July, declined the proposals of Russia and France to declare his complete solidarity with them in the present dispute. His refusal has been sharply criticized; but it proves his extreme caution and his reliance on pacific procedure at that date. Further, his action facilitated the independent and neutral attitude now adopted by Italy. A warlike attitude adopted by the British government must have compelled Italy to side with her allies.

After the declaration of war by Austria on Serbia (with the approval of Germany) events marched rapidly. Very early on 31 July there appeared at Vienna the order for a complete mobilization and this almost certainly preceded a similar order by Russia on the same day. But the two empires continued to negotiate and on 1 August seemed not unlikely to reach a settlement. But on that day the German government demanded that Russia should demobilize within 12 hours, otherwise it would mobilize. (It had already ordered the preliminary steps known as *Kriegsgefahr*). Compliance with the German demand would have left Russia unready in the face of the complete readiness of Austria and the almost complete readiness of Germany. On Russia meeting this demand with silence, the Kaiser declared war on Russia late on 1 August. His last note contained the statement that he "had undertaken in common with Great Britain the part of mediator" between Austria and Russia. This tribute to the peaceful policy of Sir Edward

Grey is in one respect incorrect. Grey had requested him merely to restrain Austria and this he had not done. Germany's attack on Russia was certain to embroil France; but the Kaiser's declaration of war on France did not reach Paris until 3 August at 6:45 P.M.

Until then the British government could not have taken definite action, though Mr. Asquith had declared the outlook to be «extremely grave.» In fact, the first sign of hostilities in the West came at Berlin on the night of 29 July. After an imperial council meeting held at Potsdam on that evening, the German Chancellor asked Sir Edward Goschen, British Ambassador, whether Great Britain would remain neutral in case of a European war, if Germany promised to take no land from France (he would not pledge himself about the French colonies), and also to restore the independence of Belgium in case a French menace to that kingdom compelled Germany to invade it. Neither Goschen nor Grey assented to these «infamous proposals,» to use Mr. Asquith's phrase. Discerning danger for Belgium, Grey on 31 July requested both Germany and France to declare that they would respect her neutrality, as they had covenanted to do by the fundamental treaty of 1839. (See BELGIUM). France at once agreed; Germany sent an evasive reply. Accordingly on 1 August Grey informed Prince Lichnowsky, German Ambassador at London, that «if there were a violation of the neutrality of Belgium by one combatant, while the other respected it, it would be extremely difficult to restrain public opinion in this country.» Lichnowsky then asked whether Great Britain would remain neutral if Germany respected the neutrality of Belgium, but Grey declined to bargain about a matter on which Germany had pledged her faith and when Lichnowsky suggested that Germany might perhaps guarantee the integrity of France and her colonies, Grey declined to follow him on a path so different from that which the German Chancellor had marked out. Grey resolved to keep his hands free, doubtless because the German government, during the Haldane interview at Berlin in the spring of 1912, had sought to tie the hands of the British government in all eventualities likely to arise. Lichnowsky informed the German government on 1 August that «Grey returned again and again to Belgium's neutrality and was of the opinion that this question would play a great part»— i.e., in deciding British policy.

It is clear, then, that the Asquith cabinet, in its meeting on the morning 1 August had come to no definite decision and was inclined to wait on public opinion. On Sunday, 2 August, Grey assured M. Paul Cambon, French Ambassador, of succor from the British fleet (held in readiness since 27 July) if the German fleet attacked that of France or her coasts. This promise (conditional on the sanction of Parliament) resulted from the recent arrangement whereby the French navy retained its chief strength in the Mediterranean, the British navy concentrating mainly in the North Sea, the English Channel and the Atlantic. And it is almost certain that war with Germany would sooner or later have arisen from this promise if Germany had carried matters through according to the plans of her general staff, which implied the «smashing» of France. But the rupture came owing to another incident in the «smashing» policy. Late on 2 August the German government demanded from that of Belgium permission to send its troops through that country on the pretext that France had violated Belgium neutrality. Early on 3 August the Brussels cabinet denied that France had been guilty of any such act, protested against the German demand and asserted its resolve to resist to the uttermost. King Albert also telegraphed to King George, requesting help from Great Britain as a guarantee of Belgian neutrality. Thereupon the indecisions of the British cabinet ended and in the evening sitting of Parliament on 3 August opinion (except among a small minority) pronounced strongly for the maintenance of the British pledge to Belgium. Grey's ultimatum of 4 August, drawn up in this sense, met with a decided refusal at Berlin, the Chancellor in his excitement exclaiming that England was going to war «just for a scrap of paper»; while Zimmermann, Under Foreign Secretary, said that neither on that night nor on any night would Germany assent to the British demand for Germany's withdrawal from Belgium. This defiant refusal by Germany to desist from the invasion of Belgium (a course still open to her) led to a state of war with the United Kingdom before midnight of 4 August.

Earlier on that day the Chancellor said to the Reichstag: «This is now for us a case of self-defense in time of necessity; and necessity knows no law (stormy applause). Our troops have occupied Luxemburg (cheers), and have perhaps set foot on Belgian soil (renewed cheers). That is against international law. . . . The wrong which we are doing we will try to make good again, as soon as our military goal is reached (cheers).» Strange to say, the German Socialists, with one prominent exception, that of Liebknecht, supported the government; and the enthusiasm with which the Reichstag greeted the news of the unprovoked invasion of Belgium, probably strengthened the resolve of the German government to proceed with that invasion, regardless of what Great Britain might say or do. The Reichstag and the majority of the Socialist members thereby made themselves responsible for the wanton attack upon France and Belgium in the course of a dispute, which as we have seen, originated in the Balkans and in the Oriental policy of the Central Empires. But it is equally probable that even if the Reichstag and the Socialists had opposed a war policy, the German government would have adopted it owing to the immense advantages which it then possessed over France and Russia in the matter of equipment and in general preparedness. After the Imperial Council meeting held at Potsdam on the evening of 29 July, the policy of Germany pointed to a rupture with both Russia and France and an invasion of Belgium. The «infamous proposals» thereafter made to Sir E. Goschen were supplemented on 30 July by Jagow's declaration to Goschen that Germany must begin her military preparations: «He regretted this, as he knew France did not desire war, but it would be a military necessity.» Everything shows that by 30 July the military party at Berlin gained the upper hand over the more peaceful Chancellor and Foreign Minister — perhaps, we may add, over the Kaiser also. The unpreparedness of France (manifested during the debates of mid-July at Paris), the prevalence of strikes in the whole transport service of Russia and the seeming imminence of civil war in Ireland, presented a concurrence of opportunities which encouraged the war-party at Berlin to insist on a swift and crushing blow at Paris, so that France (in Bernhardi's words) could never again come across Germany's path. The occupation of Belgium and northern France would also give Germany a vantage ground for the «inevitable» settlement with the British, who (in the German program) were to remain distracted by the Irish feuds and labor troubles, until the day of reckoning arrived. With Antwerp, Ostend, Calais and Boulogne in German hands, that reckoning would have been ominous. But Germany overreached herself. In face of the obvious duty to Belgium, to France and to the British race, the divisions in the British cabinet, in the nation (for a time also in Ireland) vanished and the overbearing methods adopted by Germany united the once loose compact of the Entente Powers into the finest alliance recorded by history.

German writers have blamed their Chancellor for admitting that their invasion of Belgium was an international crime. Some argue that the German Empire was not bound by Prussia's signature of the Treaty of 1839, though in other and similar matters it has taken over her obligations. Other writers state that the Gladstone government in making a separate convention with France and Germany for preserving Belgian neutrality in the War of 1870, admitted the lapse of the Treaty of 1839. But the earlier treaty was fundamental to the existence of the Belgian state and the Convention of 1870 (in Professor Geffsken's words) did not impair the original treaty but rather applied it to the special emergency of the war of that year. Others, again, state that Belgium's neutrality lapsed because of certain informal conversations (a word which the German official organ distorted into «conventions») which two British military *attachés* at Brussels had with Belgian officials in 1906 and 1912, with a view to concerting plans for the eventual dispatch of a British expeditionary force for the defense of Belgium against German invaders. But such conversations often occur, especially in lands threatened as Belgium was in and after 1906 by the new German strategic railways up to her eastern frontier; and such conversations do not in any way bind the governments concerned. No «convention» was framed between Great Britain and Belgium, as German writers assert. Indeed, on both occasions the Belgian officials stated that British troops must not be sent without the consent of Belgium. Britain did not despatch her ultimatum to Berlin on 4 Aug. 1914 until after the receipt of Belgium's appeal for aid. The procedure of both States was correct and refutes the German claim that Belgium was Britain's tool since 1906.

Other German publicists have asserted that the War of 1914 was altogether due to British greed and envy and was a «trade war» got up by the modern Carthage, which since 1904, had sought to encircle Germany and her allies. Whether England or any other state could «encircle» a block of territory stretching from the North Sea to the Black Sea, from the Baltic to the Tyrrhene Sea can be decided by reference to the map; and a comparison of the relative freedom of British and German fiscal policy is also decisive on the question of a «trade war.» That Germany took up arms to vindicate the «freedom of the seas» against England's tyranny is now scarcely worth discussing. But these and other explanations of the cause of the war are focused in the following petition of many German professors and officials to the Chancellor, dated 20 June 1915: «For the sake of our own existence we must ruthlessly weaken her (France), both politically and otherwise economically and must improve our military and strategical position with regard to her. For this purpose, in our opinion, it is necessary radically to improve our whole Western front, from Belfort to the coast. Part of the North French Channel-Coast we must acquire in order to be strategically safer as regards England and to secure better access to the ocean.» (After stating that German interests and honor require the annexation of Belgium, Poland and the Baltic provinces of Russia, the petition continues): «We must supplant the world-trade of Great Britain. By her blockade of Germany England has taught us the art of being a European power militarily and industrially independent of others. We must immediately seek to create for ourselves, apart from the Empire of the Seas, a continental commercial enceinte as extensive as possible. Our friends, Austria-Hungary and Turkey, will open to us the Balkans and Asia Minor and thus we shall assure ourselves of the Persian Gulf against the claims of Russia and Great Britain. . . . We need liberty of the seas, which was the real cause of the war between England and Germany. To obtain it we must have Egypt, the connecting land between British Africa and British Asia — Egypt, which, with Australia, makes the Indian Ocean an English sea, which joins up all the British colonies with the mother country, which (as Bismarck said) is the neck of the British Empire. The Suez Canal will then be free, and Turkey will regain her ancient right. . . . From England, which has been so niggardly in men, we can never demand enough money, because England raised the whole world against us with gold.»

This document (published in «Current History» for October 1915), reveals the views of German «annexationists» on the origins of the war and the aims which Germany sought to pursue. It may finally transpire that that program (involving the destruction of Serbia in order to dominate the near East, and the occupation of Belgium and northern France in order to compass the ruin of Great Britain) formed the fundamental cause of the war.

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J. Holland Rose,

Author of 'The Development of the European Nations,' etc.

53. GREAT BRITAIN, Diplomatic Relations of the United States with. The relations of the United States with Great Britain, both by origin and inheritance of the republic and by commercial and neighboring interests, have always been more important than relations with any other power. In them may be traced the chief threads of permanent foreign interests of the United States — the furtherance of trade and neutrality, territorial adjustment and expansion, exclusion of European interference in the American continent, the use and care of fisheries — and various conditions and incidents affecting these main interests.

The American Revolution was a protest against arbitrary colonial rule. It was fought chiefly for the rights of Englishmen against the tyranny of a line of German kings who had not yet learned the basis and spirit of English institutions. Although by its years of struggle it engendered much bitterness on both sides, it taught valuable lessons, both to the Americans and to the mother country, influencing the development of democracy and the establishment of better conditions in colonial government.

In negotiations determining the conditions of its independence, the new republic was remarkably successful, even against the secret influences of France and of Spain. It resisted the claim of England for land east of the Penobscot with which to compensate Loyalists; and, through the good will of the British government, obtained the territory between the Appalachians and the Mississippi, from which Spain desired to exclude the United States. It also obtained a generous share in the Northeastern fisheries. At the same time it agreed under conditions to recommend to the States restitution of property taken from Loyalists, to forbid further confiscations and to facilitate the recovery of debts due British citizens from American citizens.

One of the earliest lessons which the young republic learned was that it could no longer obtain the trade and the protection of British fleets enjoyed by Americans as colonists of England. By the Revolution, fought in part to secure freedom of access to the West Indies, is really lost former privileges in the British islands.

Recently torn by civil strife and not yet recovered from the misfortunes which it had suffered, the United States, with independency achieved, still found its interests in collision with the British colonial system, and especially with the irritating early British trade policy based upon the idea of establishing a mutual dependence between Canada and the British West Indies by stimulating Canada to furnish the latter with American products.

New sources of irritation arose. Ten years after the treaty of 1783, Great Britain, influenced by Canadian traders with interests in the fur trade of the American Northwest, still held within the boundaries of the United States a half dozen or more fortifications and military posts which by the treaty she had agreed to abandon, still refused to pay the damages for slaves carried from America at the close of the Revolution and still delayed to send a minister to the United States. At the same time, the United States, by neglecting to restore the confiscated estates of the Loyalists of the Revolution, and unable to assist the collection of the debts of American citizens contracted in England before the war, furnished an excuse or pretext for the British delay. For three years efforts for adjustment of difficulties were made at London by John Adams, succeeded in 1788 by Gouverneur Morris, who in 1791 was replaced by Pinckney.

The French treaties of 1778 and 1788 proved a source of embarrassment and trouble. In Congress, the followers of Jefferson, whose sympathy with France was unconcealed, proposed to close the ports of the United States to British commerce and pushed through the House a bill which was defeated in the Senate only by the vote of the Vice-President, and which, if it had been enacted, probably would have precipitated war.

Realizing the danger of the situation, President Washington, in order to counteract it, first planned to send as Minister to England his Secretary of the Treasury, Alexander Hamilton, but finding this nomination would probably be rejected by the Senate, he selected for the mission Chief Justice John Jay, who succeeded in negotiating a treaty which provided for British evacuation of the frontier posts, free commercial intercourse across the British-American border, prohibition of the fitting or arming of foreign privateers in the ports of either country for war against the other country, extradition of criminals and the appointment of commissioners to determine boundary questions, to settle the pre-Revolutionary debts of American citizens and to assess damages to American commerce from British privateers. Its chief defect was the absence of any provision against impressment of American seamen into the British service. Although the Jay treaty contained a temporary agreement (limited to 12 years) concerning the regulation of other navigation and commercial intercourse, conditions long remained unsatisfactory. Trade was hampered until the War of 1812 by seizure of breadstuffs as contraband, impressment of seamen on the high seas, blockades of continental and West Indian ports and other British acts in connection with her policy in the wars against France. Under the treaty, the question of the identity of the Saint Croix was referred in 1794 to a commission of arbitration, which in 1798 reported in favor of the English claim; but the question as to which of the two branches of the Saint Croix was the main stream was decided in favor of the American claim (the Schoodic branch). Other boundary questions remained unsettled.

Evidence of friendlier relations soon appeared. Close co-operation with Great Britain, warmly favored by Hamilton against Spanish America in 1798, was proposed more strongly as a policy by Jefferson in April 1802 in case France should take possession of New Orleans, and again in 1804–05 in case war with France and Spain should be necessary to secure the rightful boundary of Louisiana and indemnification for spoliations.

From the growth of an American merchant marine and increasing trade with Europe, in spite of English war regulations, developed disagreements and quarrels which finally sought settlement by the War of 1812. Against the British Orders in Council, which subjected to seizure American vessels bound for ports under French control, American diplomatic representations were unavailing and the consequent sacrificial embargo was doomed to disappointment.

Another disturbing source of prolonged disagreement arose in connection with the British attempt to enforce a British naval draft law by search for British citizens on American vessels on the high seas, causing a resistance at all attempts at settlement in the draft treaty of 1806 (which Monroe and Pinckney so reluctantly signed and which Jefferson refused to submit to the Senate). It culminated in the attack upon the United States ship-of-war *Chesapeake* by the British frigate *Leopard* in search for British deserters, and in the consequent American demand for reparation and apology and closure of ports to all British men-of-war — followed by a retaliatory decree by the British government prohibiting trade between the United States and countries then at war with England. This source of controversy was not completely removed until 1870, when the British Naturalization Act surrendered the doctrine of indefeasible allegiance.

After various unsuccessful efforts to settle the difficulty by diplomatic negotiations, partly with a purpose of conquest of Canada as a means of terminating the evil influence of the British Canadian trade with the Indians of the American Northwest, the United States on 19 June 1812 declared war — a war which was probably unnecessary and certainly unfortunate in producing new wounds which required a long time to heal.

The Treaty of Ghent, containing no allusion to the pretensions or ostensible causes on which the declaration of war had been founded, and omitting the article of the treaty of 1783 which had given the British a nominal right to navigate the Mississippi, applied the principle of *status quo ante bellum* to other main subjects of difference. It provided for arbitration of various matters in dispute, including the establishment of the international boundary. It also contained a clause looking toward co-operation in the suppression of the slave trade — a co-operation which, however, was not found practical in 1818–20, was not effective under the later agreement of 1842, but was finally fully realized under a convention of 1862. In 1817, as a supplement to the peace, an agreement was negotiated providing for mutual disarmament on the Lakes, except four small vessels on each side, thus removing a danger of serious future irritation and collision.

There remained several unsettled questions, some of which naturally became more important by the changes of time. There were also new sources of irritation resulting from the war and from economic and political policies.

Among the most important subjects of disagreement or possible sources of friction were the ownership of some comparatively worthless islands in Passamaquoddy Bay, the location of the northern boundary of Maine and the boundary through the Lakes, claims for slaves carried away by British war vessels during the war, other general claims, the use of the fisheries, questions relating to commerce with the British West Indian Islands, the restitution of territory taken during the war and the Northwest boundary.

Commercial relations as defined by the treaty of 1815, providing for free commerce between the ports of the two countries and between the United States and the British colonies in the East, remained unsatisfactory through a period characterized by extensive smuggling and retaliatory shipping legislation until 1830, when the United States after persistent effort obtained the privilege of trade with the British West Indies. The Passamaquoddy question was settled in 1817 by agreement of two commissioners. Fishing rights were defined by a treaty of 1818, recognizing the right of citizens of the United States to fish "forever" along certain uninhabited coasts of Newfoundland and Labrador, and granting permission for American vessels to enter the bays and harbors of the British possessions for shelter from storm and for repairs, wood and water. The same treaty also postponed for 10 years a dangerous dispute by an agreement for joint occupation of distant Oregon, which had recently attracted attention by increase of American interest in the Pacific after the Lewis and Clark expedition and by the British restitution of Astoria in 1818 — an agreement which was renewed indefinitely in 1827, with provision for termination by 12 months' notice of either party. At the same time Great Britain renounced her claim to the free navigation of the Mississippi and agreed to the 49th parallel as the international boundary forming the northern limit of the Louisiana purchase from the Lake of the Woods to the Rockies. The boundary through the Lakes was settled in 1822. The claim for slaves carried away, referred after 1818 to the Emperor of Russia and finally terminated by four commissioners appointed in 1822, was paid by Great Britain in 1826. The more difficult Northeast boundary question, first submitted to a commission which hopelessly toiled for five years (1816–21), and later (in 1827) referred to the King of the Netherlands, who in 1831 made a compromise decision which neither country would accept, unfortunately reached an alarming stage in the Maine-New Brunswick controversy of 1838 in the border conflicts known as the Aroostook War and was not settled until 1842.

Notwithstanding unpleasant memories and popular misunderstandings or diversions of criticism, the close of the War of 1812 brought a revival of the policy of earlier statesmen who at the close of the Revolution had seen the importance of British sea power in international affairs. Leaders such as Jefferson recognized that American interests required cordial relations, and even close co-operation or alliance, with the mother nation which still controlled the approaches to foreign intercourse and trade and used its defensive sea power with moderation and fairness. The mutual interest of both in reaching agreements was recognized as a fundamental basis in American foreign and naval policy.

Friendlier feeling was illustrated by the British change of policy in regard to the West Indian trade which after long negotiations and misunderstandings was opened to the United States in 1830, and by British good offices to secure a peaceable settlement of the Franco-American difficulty of 1834. New sources of possible collision arose along the international boundary in America. During the Canadian Rebellion of 1837–38 the frontier line was threatened with lawless violation of neutrality which endangered the international peace. After the capture and destruction of the *Caroline*, which had been engaged in carrying supplies to Canadian insurgents, there was a serious danger of intemperate action which was promptly counteracted by the President who sent General Scott to preserve order along the border. Belligerent feeling was increased and aggravated by the controversy between New Brunswick and Maine over the disputed boundary resulting in arrests which threatened armed collision, but the danger of hostility gradually subsided. A new irritation arose in connection with the arrest in 1840 of Alexander McLeod, the Canadian deputy sheriff, who was charged with a murder in connection with the seizure of the *Caroline*. His acquittal in October 1841 decreased international embarrassment and smoothed the way for the friendly conferences between Webster and Ashburton who by the wisdom of diplomacy settled the long-pending Northeast boundary question by the well-known treaty which each country at first regarded as a capitulation.

The Webster-Ashburton Treaty proved that, although small differences may quickly develop into serious disputes, even the most complicated international difficulties and hard knots may be untied through a mutual spirit of forbearance, consideration and conciliation. It was negotiated with a sense of duty which recognized that the two nations, notwithstanding differences of political systems, were more than other nations charged with guardianship of constitutional freedom, first obtained by long struggles and many battles in the mother country. Besides terminating the Northeast boundary dispute, it provided for co-operation in suppression of the slave trade (for five years or more) by independent squadrons, and considerably enlarged the list of crimes for which fugitives from justice might be extradited.

Meantime a series of controversies affecting Anglo-American relations arose in connection with slavery interests. The claim to the right of visit (or search) without treaty warrant, asserted by the British government in connection with the suppression of the slave trade, was a source of controversy until 1858 when it was abandoned. The parliamentary emancipation act of 1833 for the gradual extinguishment of colonial slavery in seven years, the consequent British policy of encouraging emancipation elsewhere, and the activity of the British government and the British navy in attempts to stop the illegitimate foreign slave trade which usually eluded capture by flying the American flag, greatly affected public sentiment in the United States. Among other sources of friction was that arising from the interstate slave trade by sea in American vessels from Chesapeake ports to Charleston or to New Orleans, or from Charleston to New Orleans, and stopping at the British West Indies ports of the Bahamas where under British jurisdiction the slaves were set free. The most famous case was that of the *Creole* (1841) arising from the mutiny of the slaves who carried the vessel into Nassau and were discharged by the British authorities. After 10 years of negotiations concerning the case, it was finally referred to arbitration resulting in a decision in favor of the American contention.

The general Anglo-American claims convention of 1853, under which it was submitted, also provided for arbitration of other claims of

American citizens resulting in an award in the McLeod case and important decisions regarding fishery rights.

For nearly two decades before the American Civil War, American foreign policy relating to the Caribbean was largely influenced or dominated by apprehensive fears of American slaveholders that the safety of slavery in the Southern States might be endangered by the effects of emancipation in the British West Indies, through its influence upon neighboring islands and upon general British policy in the entire region, especially in Cuba. After 1840, more or less influenced by floating rumors, the United States became somewhat apprehensive of possible British annexation of Cuba as security for Spanish loans held by British subjects, and issued a warning announcement of American policy against such a transfer. In 1848 it was watchful of conditions in Yucatan and along the Nicaraguan Isthmian transit route which invited British interference and occupation. It was also influenced by complaints submitted by Venezuela in 1841 and thereafter concerning British extension in Guiana and emigration to Venezuela which caused apprehension of British design of annexation there. In 1843, the immediate annexation of Texas was urged to counteract British designs against slavery interests; and at the same time there was a fear that its annexation might provoke Great Britain to occupy Cuba. Later rumors of the possibility of an exchange of Cuba in payment of Spanish debts or for Gibraltar doubtless influenced Polk's negotiations for Cuba in 1848 and thereafter.

In the same decade, the American government also became watchful to prevent possible sources of Anglo-American conflict in the Pacific. At the same time, British relations with China opened the way for a successful negotiation of an American treaty with China in 1844. Meantime, in 1846, the Oregon boundary question, which was an increasing source of dangerous tension and brief bluster, was settled by the American acceptance of the 49th parallel, but reserving to the British all of Vancouver Island — a geographical exception which contained the germ of another boundary dispute, finally settled in 1872.

Since 1841, the conditions of international amity had steadily improved, although certain sections of the United States were influenced by Irish limmigrants who nursed traditional enmity to England, preached the antipathy aroused after 1842 by the agitations of O'Connell and the «Young Ireland Party» and by subsequent Irish misfortune, accepted the opportunity to become an active factor in American politics, and were ready to fire a hemisphere to boil their potatoes.

After the subsidence of the brief bluster over the Oregon question, and even in the face of threatened complications in Central America, safe leaders felt the importance of peaceful adjustment based on mutual interests. A tendency in favor of a change of American foreign policy with a view to closer co-operation with Great Britain appeared about 1850. It was practically illustrated by the official action of Secretary Clayton in 1849 in authorizing Bancroft to invite Great Britain to accede to the isthmian guarantee assumed by the United States in the treaty with New Granada, and in entering into negotiations with Bulwer in 1850 for neutrality of a prospective canal across Central America, and also by the official action of both Clayton and Webster in co-operating with Great Britain and France to secure peace between the Dominican Republic and Hayti. An opposite tendency is shown, however, in Webster's later action in declining in 1852 to accede to the proposed tripartite arrangement disclaiming designs on Cuba — an idea which was probably suggested to Lord Malmesbury by the principle of the Clayton-Bulwer Treaty.

In negotiating the Central American canal question, Secretary Clayton, practical statesman, was actuated largely by a practical purpose to avoid a dangerous situation and to facilitate the completion of a great enterprise. To secure the withdrawal of Great Britain from territorial occupation against which American sentiment was fixed and irreversible, he was willing to share with her jointly the political control and use of the canal, with a guarantee of neutrality based on the doctrine of international freedom of transit. The result was the famous Clayton-Bulwer Treaty of 1850 which guaranteed the integrity and independence of Central American territory and prepared the way for the extinguishment of any British claim of sovereignty or protectorate over the Mosquito Indians along the coast of Nicaragua — a claim which was finally terminated by the English treaty negotiated by Wyke with Nicaragua in January 1860.

Unfortunately, however, the canal treaty became a source of almost endless misunderstanding and contention. Near the close of Buchanan's administration, the critically conflicting views in regard to its interpretation were finally settled by three British treaties (with Central American powers) which proved satisfactory to Cass and seemed to vindicate the Monroe Doctrine.

Anglo-American relations in Central America between 1854 and 1860 were affected and complicated by the bold designs of William Walker, America's greatest filibuster, whose designs for the control of Nicaragua and of Central America, closely related to the struggle of financiers for the control of the Nicaraguan transit route, were finally terminated by his capture and execution through English aid in 1860.

Relations in the fifties were also affected by American resentment against certain authoritative declarations indicating the existence of an Anglo-French «understanding on policy in two hemispheres» which was regarded as a threat against the Monroe Doctrine.

Relations in the Pacific increased in importance after 1850. In 1854 the United States negotiated with the king of the Hawaiian Islands a treaty of annexation which failed of execution largely because of the protest of the British consul, and Americans in the islands later suspected that British diplomacy was preparing Hawaii for a British regency at the death of Kamehameha IV, who became king in January 1855, with the intention of making this a cotton-growing colony. In 1856, however, L. D. Evans in the House indicated a basis for Anglo-American cordiality and co-operation in the Pacific.

In operations to secure friendly treatment in China in the period of confusion resulting from the Taiping rebellion, Great Britain had reason to suspect a larger co-operation of the United States, but the American government declined to act on the recommendation of American diplomatic representatives in China and confined its joint action to friendly concert on points of common interest.

Relations affecting Canada after the termination of the Northeast and Northwest boundary disputes were largely concerned with questions of fisheries, trade and navigation. The American government, seizing the opportunity offered by the disastrous effect of English commercial policy since 1846 upon Canada, and by the condition of affairs in Europe which made England anxious to avoid difficulty with the United States and Canada, entered into negotiations in 1854 for a Canadian reciprocity treaty by which the United States obtained liberal concessions, including commercial privileges and the navigation of the Saint Lawrence. The treaty, however, proved disappointing, partly because of the increase of Canadian provincial protective tariffs laid in violation of its spirit through the influence of Lower Canada.

Complication of relations with Canada were threatened after 1858 by new conditions west of Lake Superior in the Red River region adjoining the new State of Minnesota, and also on the Pacific Coast following the discovery of gold on Frazer River (in 1857) and the consequent American immigration from California and Oregon — increasing the importance of Vancouver Island and British Columbia, and, in 1859, precipitating the San Juan water boundary dispute.

In 1860, when friendly relations were undisturbed by dangerous questions, the visit of the Prince of Wales, who slept at the White House and planted a tree at the tomb of Washington, tended to increase kindred and kindly feelings.

The American Civil War furnished many serious subjects for diplomatic controversy and negotiation with Great Britain. During the war several events contributed to the renewal of suspicion and strained relations. The American government felt that the British government favored the Confederacy which threatened the integrity of the American Union, and which through its agents from the latter part of 1863 until near the close of the war endeavored to break the peace of the Canadian frontier. Although the British manufacturing classes, represented by Bright, Cobden and Forster, were opposed to the slavery interests which precipitated secession, and felt for the United States a strong friendship whose expression was silenced only for the moment by the *Trent* affair, the aristocracy and commercial classes sympathized with the Confederate States and referred disrespectfully to the "Disunited States" — and even Gladstone said "Jefferson Davis has made a nation." The British neutrality proclamation of 1861, though probably not intended to be unfriendly to the American government at Washington, was unfortunate in the time of its appearance. Actual conflict was seriously threatened by the *Trent* affair, which, however, was fortunately adjusted to the satisfaction of both governments. Other sources of irritation appeared in the use of English ports for the construction and equipment of Confederate cruisers and in the use of certain British West Indian ports as bases for Confederate blockade runners. After the period of crisis in the middle of 1863, when the French emperor was defeated in attempts made through Confederate sympathizers in Parliament to induce the English government to adopt a policy of joint European recognition of the Confederacy, British sympathy for the Confederate insurgents gradually decreased. Near the close of the war the British government feared the growing power of the United States and the activities of Fenians, which caused apprehension of possible attempts to invade British-American possessions. Relations were complicated by the Canadian canal policy which the American government did not consider liberal enough to justify the continuation of the Reciprocity Treaty of 1854 — which, therefore, was terminated in 1866 by notice of the previous year.

For several years after the close of the war, several questions which it engendered remained unadjusted; and meantime there arose new questions which increased the sources of irritation. The clash of interests and the parade of words produced various psychological changes in popular sentiment which were not easily controlled by the two governments; but gradually passions subsided, jingoism waned and antagonisms were replaced by conditions of friendly rivalry and mutual reliance.

In the meantime new conditions on the Pacific and in the Red River region west of Lake Superior threatened to complicate Anglo-American relations, already embarrassed by questions of British neutrality in connection with Confederate cruisers, and finally induced the British government and Upper Canada to take steps to secure confederation and consolidation of the British-American provinces to counteract the danger of American annexation. Later, following the American acquisition of Alaska, Anglo-Canadian consolidation policy took another step in the construction of the trans-Canadian Railway to the Pacific — to frustrate American influence in British Columbia. In 1869–70, after the failure of the Johnson-Clarendon Treaty, and perhaps influenced by a proposed policy requiring Great Britain to withdraw from all British-America, the Irish Fenians threatened to complicate international relations by plans to invade Canada.

The Treaty of Washington, resulting from negotiations after the American government dropped the flag-withdrawal proposal — negotiations doubtless hastened and facilitated by the condition of affairs in Europe, where France was succumbing to the rising power of Germany — was a great landmark in the adjustment of international questions. It submitted to arbitration three disputed questions — Alabama claims, the San Juan boundary and the Northeastern fisheries — and it also contained several other clauses (concerning bonded transit, coasting trade, navigation of rivers and canals), which directly affected subsequent relations between Canada and the United States, but it failed to renew the principle of the Reciprocity Treaty requested by the British-Canadians.

Meantime, the British doctrine of indefeasible allegiance, a source of considerable controversy, especially following the British arrest of naturalized American citizens natives of Ireland for aiding the Fenian movement after 1866, was ended by the British Naturalization Act of 1870 followed by a naturalization treaty of 13 May 1870, the principle of which had been settled by a protocol signed at London as early as 9 Oct. 1868.

Although there was a marked improvement of international feeling, various controversies continued to arise — especially in regard to the use of canals, the questions of tariffs and reciprocity and the transmission of goods in bond. The complications of threatening relations were often the result of the necessity of indirect negotiations of Canadian questions through the mother country. This condition was remedied in 1887 by a concession of Great Britain allowing Canada a share in negotiation of her own commercial treaties. In 1890 the Canadian Dominion government, by its protest, prevented the execution of the Blaine-Bond reciprocity treaty between the United States and Newfoundland.

A sporadic difficulty concerning extradition, especially concerning the invalidation of the treaty agreement of 1842, was finally terminated by an Anglo-American agreement of 1889 which conformed to the British Extradition Act of 1870, forbidding surrender for political offenses, and requiring assurances that only the alleged crime would be charged. The range of extradition was extended to include criminal fugitives of all kinds. In 1889 an act of the Canadian Parliament authorized the surrender of fugitives from justice even in cases not included in treaty arrangements.

Other chief subjects of controversy between 1880 and 1897 were, the Atlantic fisheries, Bering Sea fur fisheries, control of the proposed isthmian canal, Pacific islands and the Venezuelan boundary. For several years the North Atlantic fisheries threatened to disturb friendly relations. The fishery agreement of the Treaty of Washington was terminated in 1885 by a notice of the United States given in 1883. This restored the conditions under the treaty of 1818 and resulted in the enforcement of irritating Canadian restrictions. The Canadian authorities desiring to force a renewal of reciprocity which would allow free entry of Canadian fish into the United States, in 1885 began to seize vessels of American deep sea fishers, who, although they did not need to fish within the three-mile limit, were obliged to use Canadian harbors. In 1888 the Cleveland administration submitted to the Senate a treaty on the old reciprocity basis, but it was defeated by the representatives of the American fishermen who, largely because of the discontinuance of fishing bounties in 1866, were unwilling to admit equal competition. A temporary *modus vivendi* of 1888, reached by an international commission of six, for many years remained the only basis of the fishing industry in Canadian waters. The arrangement, although Premier Bond of Newfoundland proposed to abrogate it after the failure of the Hay-Bond Treaty of 1905, was continued by Canada and by Newfoundland until the question was settled by the Hague tribunal in 1910.

While struggling for in-shore and harbor privileges on the Northeast fishing coast, Americans assumed a different attitude in Bering Sea — where Canadians, by indiscriminate fur seal fishing after the opening of the Canadian Pacific Railway, threatened to deplete the seal herds of the north Pacific. American seizure of British vessels in 1886, in assertion of a claim to marine jurisdiction over Bering Sea, resulted in quarrelsome negotiations finally terminating in a *modus vivendi* of 1891, and a special arbitration treaty of 1892 providing for a commission which in 1893 decided against the American claim to jurisdiction but made recommendation for police protection of seals,— a recommendation finally realized by treaty arrangement of 1911 between the United States, Great Britain, Russia and Japan.

Meantime, after 1880, another source of dispute arose in connection with the revival of American interest in the interoceanic canal problem and the assertion of a policy of American control over such a canal. Both Secretary Blaine and Secretary Frelinghuysen raised questions in regard to the Clayton-Bulwer Treaty, to which Lord Granville replied in a series of notes. The discussion closed without result, but in December 1884 Frelinghuysen negotiated with Nicaragua a treaty providing for the construction of a rival canal under American auspices and American control — a treaty which was withdrawn by Cleveland who reverted to the American traditional policy of a canal under international guarantee.

The revival of interest in Nicaragua precipitated a new dispute. In 1894, Great Britain, by invitation of the Mosquitos and against the protests of the United States, landed marines at Bluefields; but later, probably recognizing that she was violating the treaty which she sought to uphold, she withdrew the marines, leaving the matter to be settled in 1895 by the submissioin of the Mosquitos to Nicaragua.

In the crisis of 1885–89 in the Samoan Islands, precipitated by German decision to enter the colonial field, Great Britain stood with the United States. In 1891, the United States joined Great Britain in an arbitration fixing the compensation which Portugal should pay for taking possession of the Lourenço Marques Railroad. In accord with priority of American interests in Hawaii, Secretary Bayard in 1888 refused to join with England and France in a joint guarantee of the Hawaiian government, and in 1892 the proposal for the annexation of the islands was largely determined by apprehension of circumstances and opportunity which might result in British occupation or control.

The British-Venezuelan boundary controversy, having its origin in the demarcation line of Alexander VI and in the early Dutch settlements in western Guiana which was ceded to the British in 1814, first arising in 1841 and resulting in an appeal of Venezuela to the United States in 1876, became acute by 1894 — inducing the American government in 1895, acting under an extreme interpretation of the Monroe Doctrine, to intervene in favor of full arbitration. When Lord Salisbury refused to admit the intervention of the United States, President Cleveland appointed an American commission to investigate the facts. Later, after further negotiations, an arbitration was arranged (2 Feb. 1897) between Great Britain and Venezuela, resulting in a tribunal which met at Paris in 1899 and rendered a decision largely favorable to Great Britain, but giving Venezuela control of the mouth of the Orinoco.

In 1898 and thereafter a great and noteworthy change was indicated in Anglo-American relations — a change which was not due to any formal treaty, or to a change of policy on either side, but to a new understanding resulting from a quickening of popular sentiment and a growth of mutual appreciation. In the Spanish-American War, although the English government was neutral, the British could not conceal their sympathy with the objects of the American government nor their satisfaction at the promptness and completeness of the result. Diplomatically in a position of "splendid isolation," and facing international danger from the impending Boer War, she became unusually cordial to the United States and doubtless would have greeted with enthusiasm an alliance either formal or informal.

Anglo-American diplomatic relations since 1898 have been characterized by a spirit of mutual accommodation and sincere friendliness, shown in many ways. The British government promptly accepted the American policy of territorial integrity and open door in China enunciated after American acquisition of the Philippine Islands. In 1899 it retired from the Samoan Islands to facilitate adjustment of American and German interests there. In the negotiations for settlement of more difficult questions at issue — questions less critical, however, than those of earlier years — it continued a policy of graceful concession.

In 1898, working under new conditions which gave American diplomacy largely increased importance, Secretary John Hay, returning from a year's useful experience as Ambassador at London, undertook to achieve a new settlement of Anglo-American disputes in line with the settlements of 1794, 1815–18, 1842 and 1871. Favored by friendly relations which made particularly delicate the question of neutrality during the Boer War, he found that the chief obstacles were the American decision for an interoceanic canal strictly under American control and the British necessity of deferring largely to Canada in the various disputes between Canada and the United States.

To secure agreement on the Americo-Canadian questions (12 in number) an international joint high commission was appointed in 1898. It entered into friendly discussions, practically reached an agreement on several subjects, made little progress on others (including reciprocity) and finally split and suffered shipwreck on the Alaskan boundary, on which the Canadian commissioners demanded a settlement before they would enter into any agreement on other questions as planned. However, only five of the 12 questions remain to be settled and most of the existing agreements on the five are not unsatisfactory. The most exciting question, that of the Alaska boundary, which suddenly became acute in 1898 as a result of the discovery of gold on Yukon, and was temporarily adjusted by a *modus vivendi* in 1899, was successfully submitted to arbitration in 1903 before a mixed commission of six and without an umpire. Fishing difficulties between the United States and Canada were settled by an Anglo-American treaty of 1908 providing for a permanent international fisheries commission. The century-old dispute regarding the Newfoundland fisheries, whose settlement was attempted in 1902 by the Hay-Bond draft treaty which was defeated by American fishery interests in the American Senate in 1904 (followed by Newfoundland retaliatory legislation, 1905–06, imposing irritating port regulations to distress American fishermen) was temporarily quieted by an annual Anglo-American *modus vivendi* and finally settled (under treaty of 1909) by a tribunal composed of the members of the Hague Permanent Court of Arbitration. Although the decision (in 1910) was mainly in favor of Newfoundland, its recommendation pointed the way by which a satisfactory agreement between the United States and Great Britain was reached. Sources of future dispute were lessened by a waterways treaty of 1909 which provided for the establishment of an international joint commission to exercise jurisdiction in cases involving the use, obstruction or diversion of boundary waters, with authority to inquire and report concerning other matters of difference along the frontier or to decide such questions as may be referred to it. A small remaining international boundary controversy concerning a small island and some fishing grounds in Passamaquoddy Bay was referred by agreement of 1911 to arbitration by a commission which after considering the trivial nature of the dispute decided to split the difference. The question of trade relations reached a crisis in the Canadian rejection of the reciprocity agreement of 1911, but a better understanding followed the passage of the American tariff of 1913 which accomplished some of the objects previously attempted by reciprocity.

To meet the new conditions required by the American decision in favor of the construction of an interoceanic canal by the American government under American control, Secretary Hay in 1900 negotiated with Sir Julian Pauncefote a new treaty which, like the Clayton-Bulwer Treaty, was based on the principle of international neutralization and international guarantee. In consequence of amendments by the American Senate, he negotiated (in 1901) the Hay-Pauncefote Treaty which provided for the abrogation of the Clayton-Bulwer Treaty of 1850, forbade blockade of the canal, permitted the United States to maintain necessary military police along the route, and declared the freedom of the canal to all vessels of all nations observing the rules prescribed for its use, subject only to equitable conditions and charges of traffic. The provision as to the charges on traffic became a subject of controversy after 1912 when Congress, with a view to decreasing the cost of transcontinental freight, exempted vessels engaged in the coast-to-coast trade. Great Britain protested that the discrimination was in violation of treaty provision, and finally it was repealed by Congress on recommendation of President Wilson in 1914 without prejudice to American rights in the interpretation of the meaning of the treaty.

After the negotiation of the canal treaty, the British government promptly recognized that American control of the Caribbean was a necessary corollary of the American construction of the canal. Partly as a result of new conditions in the Caribbean and in other parts of the world, and partly under the compulsion of the German menace of aggression, Great Britain concentrated her navy in the English Channel and the North Sea, and withdrew both fleets and garrisons from the West Indies, trusting to the United States the supremacy and control of the Caribbean region and the hemisphere — a control largely determined by and dependent upon the naval balance of power in European waters. The Monroe Doctrine, practically accepted by Great Britain, has been removed from the category of disturbing factors in Anglo-American relations.

Additional security for future Anglo-American relations was made in 1908 by the negotiation and ratification of an Anglo-American arbitration treaty. A general treaty of arbitration to facilitate the settlement of disputes and to further the advancement of the cause of general peace was negotiated in September 1914 and proclaimed in January 1915.

Preparations for the international celebration of the century of Anglo-American peace after the Treaty of Ghent were interrupted by the action of Germany in precipitating the World War. In this war, begun by the brutal invasion of Belgium and France directed by the military masters of Germany, the American government at first maintained a strict neutrality but, finally, instigated by brutal German at-attacks upon American rights on the sea, decided to co-operate with France and England in a determined effort to arrest the German menace to the peace and civilization of the world. Its decision in favor of close co-operation with the liberal governments of Great Britain and her loyal well-governed colonies against the disturbers of peace and in favor of the brave peoples whose rights were invaded, turned the tide of battle for peace and civilization. In the final concentrated and successful effort to drive back the merciless foe from invaded and devastated territories, British and Americans fought side by side with unselfish and courageous determination, and in the work of mercy and preparation for post-bellum restoration and reconstruction they co-operated in sacrifice with the single aim to establish happiness, justice and order, for the common welfare. The feeling of mutual respect and cordiality between the two countries has been strengthened by their conviction of common interest, and by their practical co-operation in a great international cause.

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GREAT CIRCLE SAILING. A great circle is a circle or a sphere the centre of which coincides with the centre of the sphere. Thus, the equator, the meridian and the ecliptic circles are such "great circles" on the globe. Between any two points on the surface of a sphere the shortest distance lies along the arc of a great circle which passes through those two places. Such a great circle cuts the successive meridians at different angles whenever the two places are not on the equator or on different meridians. The point of the curve nearest the pole is called the "vertex," the point most remote from the rhumb line is designated as the "point of maximum separation." "Great circle sailing" is merely a method of navigating vessels by the arc of a great circle. This method was first mentioned by one John Davis (1594) in a book called 'Seaman's Secrets.' It was much elucidated subsequently — by Townson (1847), by Godfrey (1858), by Captain Bergen (1880), by Goodwin (1894), and by Captain Lecky (1903). The great circle course, as followed by mariners, is that on which a vessel sails straight for her distant port, which she would follow if heading for a heavenly body directly overhead. That this heavenly body is only imaginary does not in the least rob the method of practicability. Of course difficulties of computation in great circle sailing are numerous, but the invention of several ingenious devices has greatly minimized these difficulties. Charts are prepared on what is known as the gnomonic projection, and the use is made of great circle protractors, the sphereograph and other instruments. The gnomonic chart is made by a projection of the earth's surface upon a plane, tangent to the earth at some point on its surface, taking as the point of sight the centre of the earth. By this construction, all planes cutting great circles on the earth, pass through its centre and cut the plane of projection in straight lines, so that a straight line joining any two points on the chart will be the projected arc of the great circle. Charts have been constructed in this way by the hydrographic office of the United States Navy Department, and greatly facilitate the work of the navigator.

GREAT-CRESTED FLYCATCHER, a large flycatcher (*Myiarchus crinitus*), which is a summer visitor to all parts of temperate North America, and is noted for its shrill, yet musical scream, and for its habit of entwining one or more cast-off snake-skins in its large tree-lodged nest. It is olive-brown above, with an ashy head surmounted by a tall brownish crest, and the lower parts delicate yellow. Several other species belong to the southwestern States and Mexico, and are often called crested kingbirds.

GREAT DANE, a breed of large, smooth-coated dogs, the modern equivalent of the ancient boar-hound. See Dog.

GREAT DIVIDE, The. 'The Great Divide,' by William Vaughn Moody, is one of our most representative American dramas. It was first presented on the road under the title of 'The Sabine Woman,' and was rewritten and renamed when it was produced by Henry Miller and Margaret Anglin in New York, at the Princess Theatre, on 3 Oct. 1906. The new title of the piece was symbolical of Mr. Moody's endeavor to depict a strong line between the moral freedom of Western life and character and the restrictions of a New England Puritan conscience. The London production took place at the Adelphi Theatre, on 25 Sept. 1909, with Mr. Miller in his original rôle of Stephen Ghent, and Edith Wynne Matthison in Miss Anglin's part of Ruth Jordan.

The opening act of 'The Great Divide' is the most convincing one of the three. It reveals Ruth Jordan as in a state of mind and in a physically susceptive condition for the coming of Stephen Ghent, who appears before her with his drunken companions, and barters for her with a string of gold nuggets. The fact that the other men leave him alone for gold is nothing beside the impelling force which moves Ruth Jordan to go with him from her home. Impulsively she obeys the call of the wild within her, and for the remainder of the play she struggles with her New England conscience, working her fingers to the bone to buy back from the Mexican that string of gold which burns in her brain as symbol of her shame, and struggling with her love for Stephen, which grows from more to more, despite her protesting. As for Stephen, that night's adventure has changed his whole outlook on life. Having obeyed the lawlessness in his nature, he suddenly awakens to a moral law which comes with a great love, such as his grows to be for Ruth Jordan. There is a mean between the self-denial of Ruth and the anarchy of Stephen, and in the course of the play they both find themselves in their love.

Technically, 'The Great Divide' loses much, first by its change of scene from the West to the East, and second, because of the unconvincing manner in which Ruth resists the true promptings of her heart. In the second act she deserts Stephen on purely Puritanical grounds, failing to recognize the bigness of the man he had become. It was as though Mr. Moody selected the line of least resistance,— as though running to cover was the only way in which Ruth, with her New England upbringing, could cleanse her soul. Had she faced Stephen on his own soil, the New England tenseness would have had a deeper and more profound effect, and Ruth would have realized more poignantly the spiritual change that had come over Stephen. Nevertheless, despite its drawbacks, 'The Great Divide' is an excellent example of balance between poetic imagination and literary feeling for material. And dramatically, its stage history has been distinctive.

Montrose J. Moses.

GREAT DUKE OF FLORENCE, The, a drama by Massinger, published in 1635.

GREAT EASTERN, a British iron steamship, before the *Celtic,* the largest vessel constructed, built (1854–58) at Milwall, on the Thames, for the Eastern Steam Navigation Company, by Scott Russell, from plans by I. K. Brunel; length, 680 feet; breadth, 82½, or, including paddle-boxes, 118 feet; height, 58 feet; (70 to top of bulwarks). She had six masts, five of iron and one of wood, and could spread 7,000 yards of sail, besides having eight engines, divided between her screws and paddles, and capable of working at 11,000 horse-power. From the first her career was unfortunate, the launching process alone lasting three months and costing $300,000. After several unremunerative trips to New York she was employed first as a troop-ship, and then as a cable-laying ship, for which her size and steadiness specially qualified her. Various attempts were afterward made to utilize her, but she at last came to be a mere holiday spectacle, and was broken up in 1888.

GREAT ELECTOR, The, a name given to Friedrich Wilhelm, Elector of Brandenburg, 1640–88, because he was the first of the great leaders who made Prussia the foremost of the German states.

GREAT EXPECTATIONS (1860–61), among the last of the novels of Charles Dickens, is one of the less important and widely-read of his works. It marks, however, a reversion to an earlier type of his fiction, wherein the characters, rather than any social or institutional reform, are the chief source of interest. It is perhaps freer of any animus of criticism than any of the novels, except possibly its successors, 'Our Mutual Friend' and 'Edwin Drood.' The scene is mainly in and near Rochester in Kent and, as always with Dickens, in London. The story consists mainly in taking the hero, Pip, from about the age of five years, to the time when he becomes settled in early middle life. In the course of this tale, Pip, after certain not very great hardships of childhood, alleviated by the kindness of his brother-in-law, the large-hearted Joe Gargery, and somewhat complicated by the mystifying patronage of an eccentric lady, Miss Havisham, becomes heir to great but mysterious expectations. The source of his sudden prosperity is thought to be Miss Havisham but it turns out to be a convict whom Pip as a small boy had befriended and who had escaped from Botany Bay where he had made a fortune. On the recapture and death of the latter, Pip's expectations vanish, but he has meanwhile gained enough by experience and education to be able to pursue his way successfully. The novel is less notable as a coherent and likely story than as a picture of boyhood, and for the presence of typical Dickens characters of the appealing sort, Joe Gargery, Biddy and others, the somewhat caricatured people like Wemmick, the Pockets, Wopsle, Pumblechook and a large array of grotesques, Jaggers, the lawyer, Provis, the convict, Miss Havisham, Orlick, the superfluous villian, and many more, who are, as usual with Dickens, depicted by means of habitual acts and sayings. Though none of these people are as well-known as Pickwick, the Wellers, Uriah Heep, Pecksniff, Mrs. Gamp and many of the earlier household portraits, the novel remains one of the freest from sentimentality, false pathos and grotesque oddity that Dickens ever wrote.

William T. Brewster.

GREAT FALLS, Mont., city, county-seat of Cascade County; on the Missouri River, the Great Northern, and the Chicago, Milwaukee and Saint Paul railroads; 120 miles northeast of Butte. South and nearby is a great mining region and north is an agricultural and grazing section. It has large gold, silver and copper smelters, and bituminous coal, lead, iron, zinc, gypsum, hematite and sandstone are found in the vicinity. The excellent water power which the city possesses is an inducement to manufacturers to establish works in Great Falls. The water power, at medium low water, is equal to over 350,000 horse power, and this, together with the unusual wealth of minerals, has largely aided the rapid growth of the city. There are a number of falls here; one, Great Falls, gives name to the city. The city's rapid growth has been largely the result of its natural resources. Its chief manufactures are flour, furniture, mining and agricultural instruments, wagons, carriages and woolen goods. Great Falls has a Carnegie library, a fine city hall, courthouse and seven parks, area 600 acres. The first settlement was made in 1884, and in 1888 Great Falls was incorporated. Municipal affairs are administered by a mayor, elected biennially, and a city council. Minor officials are nominated by the executive and confirmed by the council. The waterworks are owned and operated by the city. Pop. 13,948.

GREAT FISH, or BACKS, RIVER, a river in Northwest Territories, Dominion of Canada. It rises in a small lake near the northern shore of Lake Aylmer, flows in a northeasterly direction through Lakes Beechy, Pelley and Garry, and enters the Arctic Ocean by a wide estuary. King William Land is near its mouth. The Great Fish River is 605 miles in length. Sir George Back, the Artic explorer (1796–1878) explored the river in 1834–35 and followed it to the ocean. He described Ah-hel-Dessy, or Parry Falls, on one of the tributaries, as more grand than Niagara in splendor of effect. Consult Back, 'Narrative of the Arctic Land Expedition to the Mouth of the Great Fish River' (1833–35).

GREAT FISH RIVER, a river in Cape Colony, South Africa, which rises in the Sneeuwberg, or Snowy Mountains, and after a southeasterly course of 230 miles, enters the Indian Ocean at lat. 33° 25′ 5″, and long. 27° 8′, about five miles northeast of Port Alfred.

GREAT HARRY, the first double-decked ship built in England, and the first British war vessel. It was constructed in 1509, and cost £14,000. In 1553 an accidental fire destroyed it.

GREAT HORNED OWL. See Eagle Owl.

GREAT ISLAND. (1) A small island at the entrance to Portsmouth Harbor, N. H. It has a lighthouse 90 feet high. (2) An island in Bass Strait, between Tasmania and Australia; the largest of the Furneaux islands. It is about 40 miles long and 12 miles broad. Pop. 42,100.

GREAT KANAWHA, name formerly applied to the Kanawha River (q.v.).

GREAT KANAWHA, Battle of. See Point Pleasant.

GREAT KEI, the principal member of the Kei Islands (q.v.).

GREAT LAKES, the name given to the chain of lakes on the northern border of the United States. They include Lakes Superior, Michigan, Huron, Saint Clair, Erie and Ontario; Michigan only lying wholly within the United States, and no one of the lakes wholly within the territory of the Dominion of Canada. Their area is about 94,000 square miles; elevation, Lake Superior 600 feet above the sea, and Lake Ontario 250 feet. The fall of Lake Superior to Lake Erie is about 40 feet. No large river flows into the Great Lakes; the Saint Lawrence River is the outlet. The basin of the Great Lakes averages in width about 100 miles north and south of the north and south shores respectively. The combined coast lines in the United States have a shore line of about 3,075 miles. These great inland seas constitute the largest body of fresh water in the world and their fisheries have an annual value of about $3,500,000. Like all large bodies of water they affect the climate of the surrounding country. Good farms, extensive forests and valuable minerals are found along the coasts. On the southern shore of Lake Superior (q.v.) are found masses of ore and low mountains apparently of eruptive origin. The Great Lakes have been the means of developing to a considerable extent the Northwest, as they are the main thoroughfares by which the products of the large farms, the cattle ranches, the mines and the forests have been brought to eastern markets. Coal and manufactured products of the east pass over the lakes to western markets. The line of cities around the Great Lakes have increased in commercial importance and population with great rapidity. Among these lake ports, all terminals of railroad trunk lines, are Toledo, Chicago, Cleveland, Milwaukee and Buffalo. The "Soo" canals connect Lake Superior with Lakes Michigan and Huron, the Detroit River makes the connection with Lake Erie, and the Welland Canal around Niagara Falls with the Saint Lawrence River, the outlet to the Atlantic Ocean. These connecting links have undergone great engineering development in the interests of transportation and an enormous traffic and tonnage passes through them annually. The freighters built to accommodate the trade in iron ore, coal and grain, together with elevators and machinery, represent the greatest development in cargo handling ever known. The total freight tonnage passing through the «Soo» canals in a recent year was 79,718,334 tons; through the Detroit River 85,376,705 tons valued at $927,191,016; and 1,156 vessels, of which 837 were steamers, used the latter passage. (For canals connecting the Great Lakes with rivers, see articles on the respective lakes; also BOUNDARIES OF THE UNITED STATES; CANALS; SHIP CANALS). Consult Chandler and Lansing, 'Story of the Great Lakes' (New York 1909); Johnson, C., 'Highways and Byways of the Great Lakes' (New York 1911); Mills, 'Our Inland Seas' (Chicago 1910).

GREAT MEADOWS, Pa., Engagement at, 28 May 1754; Washington's first fight. When the French built Fort Duquesne (now Pittsburgh), driving off an English force which had begun to fortify the same spot, it was evident that the decisive struggle for mastery of the American «hinterland» was to begin; and the commander of the nearest English force, a Virginia militia officer of 22, named George Washington, at once sent a messenger to Governor Dinwiddie and wrote letters to the governors of Pennsylvania and Maryland, urging all to send troops and expel the French. Meantime he set out with his force to build a fort on the Monogahela where Brownsville, Pa., now stands. Constructing a road as he went, he halted at the Great Meadows of the Youghiogheny, a bushy field at the foot of Laurel Hill — a good camping-place and defensible position. Hearing from his scouts that the French had learned of the English activity, and sent out a party to engage any English band they met, he cleared the field of bushes and threw up an intrenchment behind a ravine crossing the field; but instead of waiting an attack, took 40 men for a night surprise of the French, guided by Indian allies. It was raining hard, the path was often lost, and he did not reach the French camp till morning. They were an advance party of 32, sent out to reconnoitre and, hearing of Washington's advance, they had hidden in a rocky hollow and sent back for reinforcements, but attempting defense when surprised, the commandant — Ensign Jumonville — and nine men were killed, and the rest captured and taken to the camp at Great Meadows. Washington lost one killed and three wounded. The sequel is told under FORT NECESSITY.

GREAT NORTHERN RAILWAY COMPANY. This company had its beginning in the Minneapolis and Saint Cloud Railroad, chartered 1 March 1856. Legislative permission to change its name was granted in 1869, but it was not until 18 Sept. 1889 that the road received its present title. On 1 Feb. 1890 the company assumed the operation of the Saint Paul, Minneapolis and Manitoba Railway, and subsequently purchased a large proportion of its stock. On 10 Oct. 1907 the stockholders of the Great Northern authorized the purchase outright of a large number of subsidiaries operating in the territory from Minnesota westward, and which the company had controlled through stock ownership. A few weeks later the Saint Paul, Minneapolis and Manitoba Railway also was brought under absolute ownership. The system including the mileage owned by the Montana Eastern Railway Company and Great Falls and Teton County Railway Company extends from Saint Paul northwestward through Minnesota and North Dakota and thence westward through the northern parts of Montana and Idaho and through central Washington to Seattle; with many ramifications in Minnesota, Wisconsin, Iowa, North Dakota and South Dakota, Montana, Idaho and Washington and several sections of Canada.

The total mileage operated in 1917 was 8,255.98 miles, of which 7,123.77 miles were owned by the company and the remainder held under leases and trackage rights. The operating revenues for the year ended 31 Dec. 1917 were $88,534,163, earned by the transportation of 8,382,035 passengers and 30,650,814 tons of freight. The passenger travel averaged 79.58 miles at an average charge of 2.374 cents per mile — aggregating in the year 667,036,192 passenger miles and receipts of $15,836,341. The freight traffic averaged a haul of 274.03 miles per ton, at an average charge of 0.766 cents per ton per mile, aggregating in the year 8,399,349,197 tons-miles and receipts of $64,300,666.

The operating expenses for the year were $59,243,785. After deducting taxes and uncollectible income, the net operating income was $22,987,546. The gross income, including among minor items, $10,053,942 dividends upon stock held in other railroads and enterprises was $35,774,332. Deductions (which include $11,077,181 interest on the funded debt) leave a net income from all sources of $23,021,752. Of this sum $17,462,959 was appropriated for payment of dividends; $60,474 to sinking and other reserve funds and $5,385,635 for miscellaneous purposes. A credit balance of $112,683 was transferred to profit and loss.

The equipment of the Great Northern on 31 Dec. 1917 consisted of 1,320 locomotives, with an aggregate tractive capacity of 50,130,000 pounds; 718 passenger coaches (including sleeping and parlor cars) with a total seating capacity of 43,444 persons; and 57,637 freight cars with a total capacity of 2,187,349 tons. By far the largest item of freight transported was that of ores and metals, amounting to nearly 48 per cent of the entire body of freight. The second largest item was coal, amounting to 12 per cent, followed by grain, which accounted for 10 per cent. The operating revenues per mile of road was $10,756 and the operating expenses $7,198, making the net operating revenue per mile of road $3,558.

The entire investment in the road and its equipment on 31 Dec. 1917 was $401,790,918. Other investments of the company amounted to $243,253,549. The total stock outstanding on the date cited amounted to $249,477,138; and the total long term debt (exclusive of the company's liability for the Northern Pacific, Great Northern, Chicago, Burlington and Quincy joint bonds issued against Chicago, Burlington and Quincy Railroad stock deposited as collateral) to $163,430,739. The credit balance of the profit and loss account was $75,339,382.

The Great Northern Railway jointly with the Northern Pacific Railway Company owns nearly the entire stock of the Chicago, Burlington and Quincy Railroad.

Other properties of the company are the Somers Lumber Company, Chelan Electric Company, and the Cottonwood Coal Company. In Canada the company has a proprietary interest in the Brandon, Saskatchewan and Hudson Bay Railway; the Crow's Nest Southern Railway, the Manitoba Great Northern Railway; the Nelson and Fort Sheppard Railway; the New Westminster Southern Railway; the Red Mountain Railway; and the Vancouver, Victoria and Eastern Railway and Navigation Company, and owns jointly with the Northern Pacific Railway Company the Midland Railway Company of Manitoba. These lines are operated as part of the Great Northern Railway System. The Company also controls, through stock ownership, the following railway companies: Watertown and Sioux Falls Railway Company; Duluth Terminal Railway Company; Minneapolis Western Railway; Montana Eastern Railway Company; and the Great Falls and Teton County Railway Company.

The lines of this company were taken over for operation by the United States government under proclamation of the President on 28 Dec. 1917. Consult Poor's Manual of Railroads for 1909, 1910 and 1918; and the Interstate Commerce Commission's Reports on Common Carriers.

GREAT PACIFICATOR, a name given Henry Clay (q.v.), on account of his efforts to reconcile the conflicting interests of North and South, especially in connection with the Missouri Compromise.

GREAT PEDEE, a river which has its rise in the mountains of the northwestern part of North Carolina, flows south and east across the State, and enters South Carolina at Marlboro County, in the northeastern part of the State, then flows southeast into Winyaw Bay, an inlet of the Atlantic. In North Carolina the river is called Yadkin. About where the Little Pedee joins the Great Pedee, and south to its mouth, there are several quite large islands. The river is navigable for a distance of about 150 miles from Winyaw Bay.

GREAT PLAINS. The Great Plains province is that part of the continental slope which extends from the foot of the Rocky Mountains eastward to the valley of the Mississippi, where it merges into the prairies on the north and the low plains adjoining the Gulf Coast and the Mississippi embayment on the south. The Great Plains present wide areas of tabular surfaces traversed by broad, shallow valleys of large rivers, most of which rise in the Rocky Mountains. They are also cut more or less deeply by the narrower valleys of tributary streams. Smooth surfaces and eastward-sloping plains are the characteristic features of the province, but in some parts of it there are buttes, extensive escarpments, and areas of badlands (q.v.). Sand hills surmount the plains in some localities, notably in northwestern Nebraska, where they occupy an area of several thousand square miles. The region is made up of soft rocks, sands, clays and loams, in general spread in thin but extensive beds that slope gently eastward with the slope of the plains and lie on relatively smooth surfaces of the older rocks. The source of these deposits was mainly to the west and the materials were deposited layer by layer either by streams on their flood plains or in shallow lakes and, during earlier times, in the sea. The strata show but few local flexures, as the region as a whole has been alternately uplifted and depressed but not subjected to folding. During earlier epochs the surface was even smoother than at present. Owing to the great breadth of the plains and their relatively gentle declivity, general erosion has progressed slowly notwithstanding the softness of the formations; and as at times of freshet many of the rivers bring out of the mountains a larger load of sediment than they can carry to the Mississippi, they are now locally building up their valleys rather than deepening them.

The Great Plains province as a whole descends to the east about 10 feet to the mile from altitudes approaching 6,000 feet above the sea at the foot of the Rocky Mountains to about 1,000 feet near Mississippi River. The altitudes and the rates of slope differ considerably in different districts, particularly to the north, along the middle course of Missouri River, where the general level has been greatly reduced. The Great Plains rise to an altitude of 6,200 feet at the foot of the Rocky Mountains west of Denver, and maintain this elevation far to the north, along the foot of the Laramie Mountains. High altitudes are also attained in Pine Ridge, a plateau which extends from near the north end of the Laramie Mountains eastward through Wyoming, across the northwest corner of Nebraska, and for many miles into southern South Dakota. Pine Ridge marks the northern margin of the higher part of the Great Plains and its north side presents cliffs and steep slopes descending 1,000 feet into the drainage basin of Cheyenne River, one of the largest branches of the Missouri. From this basin northward the Great Plains comprise a succession of other basins with relatively low intervening divides, which do not attain as high an altitude as in the region to the south. This northern extension of the Great Plains is drained by the middle branches of Missouri River, of which the larger members are Yellowstone, Powder, Little Missouri, Grand, Cannonball, Moreau, Cheyenne, Bad and White rivers. On the southern slope of Pine Ridge is Niobrara River, which rises in the midst of the high plains some distance east of the north end of the Laramie Mountains. Farther south are Platte River, with two large branches heading far back in the Rocky Mountains, and Arkansas River, both of which cross the plains to the southeast and afford an outlet for the drainage from a large area of mountains and plains. Between Arkansas and Platte rivers is Republican River, rising near longitude 105°, these having an extensive system of local drainage in eastern Kansas and Nebraska. South of the Arkansas are Cimarron River and numerous smaller streams that head in the western portion of the plains.

The sandstones underlying the Great Plains contain water available for artesian wells and large flows have been obtained at some localities. The other natural resources are limestones and clay for cement, oil and gas, fullers earth and volcanic ash. To the east where rainfall is sufficient, agriculture is the most important industry, while the great semi-arid portion to the west is mostly devoted to cattle raising. Consult Darton, N. H., 'Geology and Underground Resources of the Central Great Plains (U. S. Geol. Survey, Prof. Paper 32, 1905); Johnson, W. D., 'The High Plains and Their Utilization' (U. S. Geol. Survey, 21st Report, Pt. IV, and 22d Report, Pt. IV).

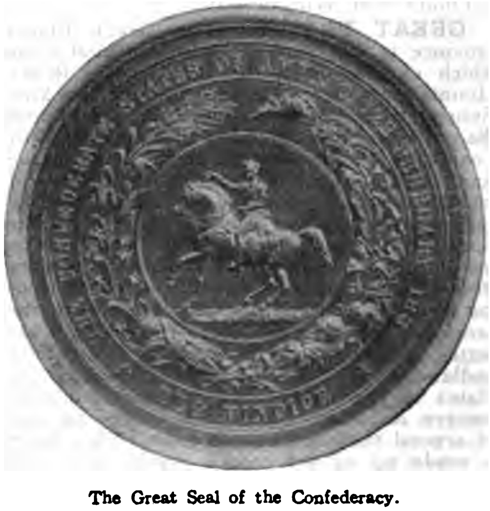
N. H. Darton,
Geologist, United States Geological Survey.

GREAT RIFT VALLEY, a valley extending from Palestine in Asia to the southern part of Lake Tanganyika, Central Africa. A series of rift valleys form the depression, beginning in the region of the Jordan and the Dead Sea and extending across the Red Sea Basin to the strait of Bab-el-Mandeb; thence crossing French Somaliland and Abyssinia to Lake Rudolf in British East Africa. Two branches become apparent at this point, one extending on the south to Lake Manyara and beyond; and the other reaching westward to Albert Nyanza, and thence southward to Lake Tanganyika. This depression contains most of the Great African Lakes. Traces of lava sheets, extinct volcanoes and several minor active ones occur at intervals, but the valley is due to downfaulting of long narrow blocks. Some of the rock walls in Central Africa rise to a height of 4,000 to 5,000 feet above sea level.

GREAT SALT LAKE, a body of water in the northwestern part of Utah, the principal drainage centre of the Great Basin (q.v.); bounded on the east by the Wasatch Mountains, on the west by the Great Salt Lake Desert. It is about 4,200 feet above sea-level, 80 miles long and from 20 to 32 miles wide. Its chief inlets are the Bear, Ogden and Weber, and the Jordan which brings the fresh waters of Lake Utah. Great Salt Lake has no apparent outlet save evaporation. In 1850 the amount of saline matter held in solution was 22.4 per cent, in 1869 only 14.8 per cent. Between these dates the amount of water flowing in annually exceeded the evaporation, and the lake increased in area from 1,700 to 2,360 square miles. Since 1869–70 the lake has been receding. One cause of the water diminishing in volume is the amount used for irrigation; but the amount of water contributed by the inlets has decreased since 1870. At one time Great Salt Lake was much larger than it is now. The bars, cliffs and beaches formed by the waters of the ancient lake (called Lake Bonneville) are plainly visible along the base of the mountains. Lake Bonneville had an area of 19,800 square miles and a depth of 1,100 feet. Its depth near where the great Mormon Temple now is was about 850 feet. Its dry bed is now occupied by nearly 200,000 people. The waters of Lake Bonneville reached the ocean through Columbia River. Geological investigations show that there have been at least two moist periods with intervening and subsequent periods of dryness. A change from the present dry climate and scant rainfall to a moist climate would result in a great increase in area of the waters in the lakes and rivers and a return to former water areas. Great Salt Lake has several islands, the largest of which, Antelope, is 18 miles long. No fishes seem to exist, but several species of insects and brine-shrimps have been found in the waters; and waterfowls in large numbers frequent the shore. The first mention of Great Salt Lake appeared in a report made by the Franciscans, in 1776. Father Escalante and companions seem to have traveled from Mexico to this region. A report made also by the Franciscans early in the 17th century mentions the large rivers and lakes and the mineral wealth of this section. In 1843 Fremont explored and described this region, and a thorough survey was made in 1849–59 by Howard Stansbury, captain in the United States Army. (See Utah). Consult 'Jesuit Relations'; Bancroft, 'Utah'; United States Reports and Surveys.

GREAT SEAL, the sign affixed to documents to denote royal authority. It is affixed on all solemn occasions to all papers expressing the pleasure of the sovereign; and was first used by Edward the Confessor. The Lord Chancellor was at first entrusted with the keeping of the seal; but as the duties of the chancellor multiplied, another office was eventually created for the special purpose of performing all the duties connected with the seal. In the reign of Elizabeth, the status of the keeper was raised as high as that of chancellor, and in subsequent reigns, the offices of keeper and chancellor were again fused. The last holder of the independent title being Sir Robert Henley (Lord Northington) who succeeded to the chancellorship on the accession of George III. There is now one seal used in the United Kingdom for sealing writs to summon Parliament, for foreign treaties and all public acts of state. This affects Scotland and Ireland except in grants and writs concerning private rights in these countries.

GREAT SEAL OF THE CONFEDERACY, The. It is not generally known that the Confederate States of America possessed a symbol of sovereignty in the form of a great seal, and its evolution, history and significance is of interest to all citizens of the reunited nation. When the Confederate government was founded at Montgomery, Ala., it was early suggested that a seal be devised, but it took months of fruitless attempts to enact a law establishing a great seal. Several times during the first years of the fratricidal struggle the representatives in the Confederate congress introduced bills looking to the creation of a symbol of nationality, but the senators, who were less hope-



The Great Seal of the Confederacy.

ful of ultimate triumph over the Union or Federal powers, discouraged and voted down these legislative attempts. But in 1863 the Confederacy gained new hopes, since foreign powers gave evidence of concern and sympathy for the Southern cause, and as a result the following bill passed the senate:

> Resolved, by the Senators of the Confederate States of America: That the seal of the Confederate States shall be: In foreground, a confederate soldier in position to charge bayonet; in the middle distance, a woman with a child in front of a church, both with hands uplifted in the attitude of praying: for a background, a homestead in the plains, with mountains in the distance, beneath the meridian sun; the whole surrounded by a wreath composed of the stalks of sugar cane, the rice, the cotton and the tobacco plant — the margin inscribed with the words: "Seal of the Confederate States of America" (above) and "Our Homes and Constitution" (beneath).

The bill failed to receive the required support in the House, and in a few months the following bill had its origin in the upper branch of the government:

> Resolved, by the Senators of the Confederate States of America, That the seal of the Confederate States shall consist of: An armed youth in classic costume, standing; beneath a woman is clinging. The whole surrounded by a margin of rice, cotton, tobacco and sugar cane. Motto, "Pro Aris et Focis." The design surrounded by these words, "Seal of the Confederate States of America."

The bill met a like fate, since the representatives disapproved of the senatorial proposition.

Prior to the spring of 1862 the Congress of the Confederacy was provincial; the permanent government was not established until 22 Feb. (Washington's birthday) 1862; and it was at the third session of the permanent congress that a bill passed both branches and received the signature of President Jefferson .Davis. The act reads as follows:

> "No. 4. Joint resolution to establish a seal for the Confederate States: That the seal of the Confederate States shall consist of a device representing an equestrian statue of Washington (after the statue which surmounts his monument in the Capitol square at Richmond), surrounded with a wreath composed of the principal agricultural products of the confederacy: cotton, tobacco, sugar cane, corn, wheat and rice — and having around its margin the words: 'The Confederate States of America; Twenty-second February, Eighteen Hundred and Sixty-two,' with the following motto: 'Deo Vindice.'"

The design for a seal was purely the result of Confederate originality and imagination; it was free from heraldic devices and possessed none of the elements of armorial language. The meaning of the symbols is clear: Washington, a southerner, owned slaves — and God favors our cause.

The *Savannah News* of 1 May 1863, says editorially:

> "The confederate congress has at length adopted a great seal which we think is both appropriate and in good taste. This device and motto will be approved by the good taste and moral sentiment of our people, and now it only remains for congress to adopt an appropriate flag for the confederacy, in order that we may present to the world a symbol as well as the power and substance of a great and glorious nationality."

On 20 May 1863, J. P. Benjamin, Secretary of State of the Confederacy, sent a dispatch to James M. Mason, Commissioner of the Confederacy to the government of Great Britain, expressing the will of Congress with regard to the proposed seal. Part of the message reads: "Sir:— Congress has passed a law establishing a seal for the confederate states. I have concluded to have the work executed in England, and request that you will do me the favor to supervise it. You will receive a copy of the act, and a photograph of Washington's statue. The photograph represents the horse as standing on a summit of an obelisk, but in the seal the base ought to be the earth. . . . It is not desired that the work be executed bv any but the best artists that can be found, and the difference of expense between poor and fine specimen art in engraving is too small a matter to be taken into consideration in a work that we fondly hope will be required for generations yet unborn." Mason's reply says: "Mr. Wyon (her majesty's engraver) is to engrave the seal, and he informs me that it will require six weeks or two months to finish it, as he is very anxious to bestow upon it all the pains so important a work demands. He is executing it in silver, which offers the advantage of proof against rust, so often destructive to seals executed in steel. The cost of engraving the seal including the press for working it, will be 80 guineas." The seal, when completed was brought to America by Lieutenant Chapman and delivered to Hon. J. P. Benjamin who, finding it satisfactorily executed, officially accepted the work. It has been thought that the great seal of the Confederacy was never officially used; this proves to be a mistake since the seal was affixed as a symbol of sovereignty on a large number of documents which went abroad, and a few were placed on appointments of government officials of high rank.

It has often been asked what became of the great seal of the Confederacy and where is the instrument at present? When the Confederate government was forced from Richmond, causing the surrender of the Confederate soldiers, many of the southerners seized what few government tokens were available and speedily withdrew to the surrounding country towns. Among the various tokens captured was the great seal of the Confederacy. One of the clerks of the State department seized it and disappeared. For a time rumor had it that the seal bearer, fearing longer to carry and hide the great treasure, threw it into a well and made his escape. This rumor possesses no truth. The following letter from Col. John T. Pickett of Confederate fame attests: "At considerable trouble and expense I have been so fortunate as to rescue this interesting memorial (the seal of the confederacy) from oblivion and possibly a vandalic melting pot. It is of pure silver and weighs several pounds." Theodore J. Pickett, Esq., son of the famous southern colonel, Pickett, writes that he is in possession of the original correspondence between his father and those who had the seal. He has done much to preserve the history of this relic. His father shortly before his death contributed it to the War Department at Washington, D. C. The following letter from the Secretary of War will be of interest: "The archives of the Confederate government form perhaps the most interesting set of historical relics in the possession of the government. They were at Richmond and gotten elsewhere and handed over to the War Department at Washington. They have been carefully arranged, and are now packed away from view in two or three rooms of the big war, navy and state buildings. They are never shown to visitors, and the greatest care is taken in regard to them. Among these relics is the seal of the Confederate States of America." Before the seal was yielded to its final depository a few electrotype copies were made in silver, and the illustration in this article is produced from one of these certified electros now in the writer's possession. Though the use and purpose of this artistic device was ephemeral, its emblems and motto are of a character in fullest accord and harmony with the true spirit of the great nation born at Independence Hall, Philadelphia; the equestrian figure of Washington signifies much to the citizens of this republic, and the motto, «Deo Vindice,» should inspire all sections of our country to have a deep and abiding faith in the government represented by the Stars and Stripes.

The Department of State of the Confederacy also had a seal. It consisted of a shield crossed or quartered by a Saint Andrews' or Saltier cross, blue upon which were blazoned nine stars (argent). The top quarter had a ship for commerce; the dexter quarter, cotton; the sinister quarter, tobacco, and the base quarter, corn. The crest was a rising sun with a glory, above which the words «Department of State,» appeared. Below the shield the latin words: «Nulla Patria Amiotæ Fidei» and beneath this motto in large letters «Confederate States of America.»

Bernard J. Cigrand,
Lieutenant United States Navy; author of 'Great Seal of United States of America' and 'History of United States Flag.'

GREAT SEAL OF THE UNITED STATES. On 4 July 1776 when the Declaration of Independence had been finally acted upon, John Hancock, president of the Continental Congress, arose and said, «We now are a nation, and I appoint Benjamin Franklin, John Adams and Thomas Jefferson a committee to prepare a device for a Great Seal of the United States of America.» The committee immediately proceeded to perform its assigned duty and after six weeks of labor, during which time many designs were submitted and considered, it was agreed that the conjoint design of Jefferson be reported to Congress on 10 Aug. 1776. His device for a Great Seal was very elaborate, containing on a shield something emblematic of the several nations from which America was peopled. Jefferson's report read as follows: «The committee to whom was referred on the Fourth day of July last, the duty of preparing a device for a Great Seal of the United States of America, in Congress assembled, beg leave to report the following description:

"The Great Seal should on one side have the arms of the United States of America, which arms should be as follows: The shield has six quarters, parti, one, coupe, two. The first or, an enamelled rose, gules, and argent, for England; the second argent, a thistle proper, for Scotland; the third vert, a harp, for Ireland; the fourth azure, a fleur-de-lis, for France; the fifth or, the imperial eagle, sable, for Germany; and the sixth or, the Belgic crowned lion gules, for Holland; pointing out the countries from which the States have been peopled. The shield within a border gules, entwined of 13 escutcheons, argent, linked together by a chain or, each charged with initial sable letters, as follows: (1) N. H., (New Hampshire); (2) Mass., (Massachusetts); (3) R. I., (Rhode Island); (4) Conn., (Connecticut); (5) N. Y., (New York); (6) N. J., (New Jersey); (7) Penn., (Pennsylvania); (8) Del., (Delaware); (9) Md., (Maryland); (10) Va., (Virginia); (11) N. C., (North Carolina); (12) S. C., (South Carolina); (13) Ga., (Georgia); for each of the 13 independent States of America.

"Supporters, dexter, the Goddess of Liberty, in a corslet of armor, in allusion to the then state of war, and holding in her right hand the spear and cap, and with her left supporting the shield of the States; sinister, the Goddess of Justice, bearing a sword in her right hand, and in her left a balance.

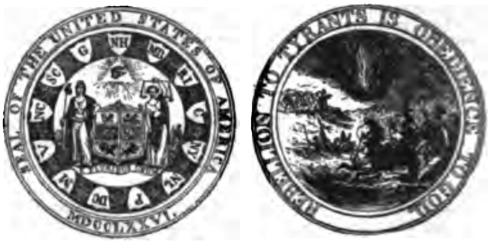
"Crest, the eye of Providence in a radiant triangle; whose glory extends over the shield and beyond the figures' motto, 'E. Pluribus Unum.'

"Legend round the whole achievement, 'Seal of the United States of America, MDCCLXXVI.'

"On the other side of the said Great Seal should be the following device:

"Pharaoh sitting in an open chariot, a crown on his head, and a sword in his right hand, passing through the divided waters of the Red Sea, in pursuit of the Israelites. Rays from a pillar of fire in the cloud, expressive of the divine presence and command, beaming on Moses, who stands on the shore, and extending his hand over the sea, causes it to overthrow Pharaoh.

"Motto, 'Rebellion to Tyrants is Obedience to God.'"



Conjoint Devices — Reported by Jefferson.

Without any additional remarks, after having finished reading, Jefferson quietly took his seat. Congress referred the report back to the committee, asking for an early supplemental report. It may be interesting to learn how Jefferson came to make the report and also learn what Franklin and Adams contributed to the committee's report. A Frenchman, Du Simetière by name, had been requested to attend the committee meeting, he being the most expert pen-and-pencil artist in Philadelphia. He took great interest in the American cause; and his attention was early called to the fact that in America, artists were in demand; and, in consequence he began painting profiles in black, of distinguished Americans and caricatures of prominent Englishmen engaged in the war. His paintings and miniatures had attracted general attention, which led the committee to engage him to sketch devices for a Seal. Du Simetière proposed a Norman shield divided into six quarterings.

First Quartering symbolized the English inhabitants of this country and placed first upon the shield to indicate that they were a primary factor in the new confederacy. English civilization was planted among the forests of America as early as 1607, in the colony of Virginia.

Second Quartering was intended for Scotland, a thistle in its proper color or an argent field, representing Scotch people as included in our national fold.

Third Quartering, green, with a harp of gold, was to be the respected symbol of Ireland, and was placed upon the shield as a token to the Irish patriots who took an active part in the war for independence.

Fourth Quartering was supposed to do honor to the French people.

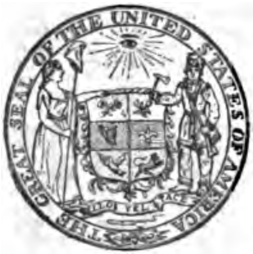
Fifth Quartering, in honor of the German settlers was a golden field and upon it the imperial black eagle.

The Sixth Quartering represented the Dutch and a lion in gules was the emblem.

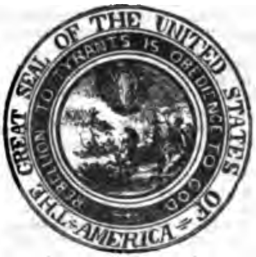
The dexter supporter of the shield was the Goddess of of Liberty, with a Phrygian cap on a staff. The sinister supporter was to typify a continental soldier in uniform, holding in the right hand a hatchet, in the left a gun. As a motto or "war cry" the Latin words, "*Bello vel Pace.*" Above the shield an eye of Providence. The border contained the words: "The Great Seal of the United States of America."

Franklin proposed for a Seal, Moses lifting his wand and dividing the Red Sea, and Pharaoh and his chariot overwhelmed with the waters. For a motto well befitting the existing circumstances and one that would be a cherished «war cry» for future generations he suggested: «Rebellion to Tyrants is Obedience to God.» Franklin's aim was to depict that Providence favored slaves and bondsmen, and destroyed tyrants and usurpers; and for his illustration he chose the war between the Israelites and Egyptians. In modern times the legend on his design began to be used about 1645, and was then used as a «war cry» by Cromwell's party; it was intended to refer to Charles I. The reinvention has been attributed by some, to Oliver Cromwell, but later research would indicate that John Bradshaw, president of the court of judges who tried Charles I, is the person who gave voice to this expressive motto. Thomas Jefferson later adopted this motto as his sentiment on his personal seal. But Jefferson suggested to the committee that the Seal contain an obverse and a reverse side: on the former the Children of Israel, led by a «cloud» by day and a «pillar of fire» by night; on the latter Hengist and Horsa the «Saxon Chiefs, from whom we claim the honor of being descended, and whose political principles and form of government we are now about to assume.»

John Adams' proposal was of a different character; he recommended — so the report tells, «The choice of Hercules, as engraved by Gribelin in this edition of Lord Shaftesbury. You notice the hero resting on a club; Virtue pointing to her rugged mountain on one hand, and persuading to ascend; and Vice glancing at her flowery paths of pleasure, wantonly reclining on the ground, displaying the charms both of her eloquence and person, to seduce him into vice.» Hercules, as the central figure, was to symbolize the young nation; indicating strength, valor, perseverance and immortality. The Goddess of Pleasure, on the sinister side, was to depict all forms of corruption, and would thoroughly represent a lack of dignity and respect, or the seven vices — pride, wrath, envy, lust, gluttony, avarice and sloth. The Goddess of Virtue, on the dexter side, was to be the guide of the young government and as such would enforce her «seven cardinal excellences,» namely, Faith; Hope; Charity; Prudence; Justice; Fortitude and Temperance.


THE GREAT SEAL OF THE UNITED STATES OF AMERICA
BELLO VEL PACE

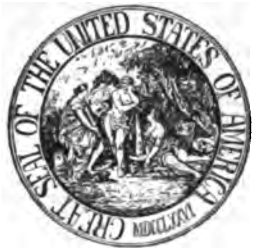
Du Simetière's Design of Seal.


THE GREAT SEAL OF THE UNITED STATES OF AMERICA
REBELLION TO TYRANTS IS OBEDIENCE TO GOD

Franklin's Suggestion.

These few designs were then carefully considered by the committee and finally Franklin suggested that the draughts be placed in Jefferson's hand and that he select the meritorious features in all and combine them into a conjoint device. This is how it came about that Jefferson reported to Congress the composite device for a Great Seal. In this conjoint design by Jefferson, we see several new ideas — namely, a goddess of justice, and the 12 shields in the border, representing the colonies, bound together by 13 links of a chain. He also added the motto, «E Pluribus Unum,» and his drawing dated the Seal MDCCLXXVI.

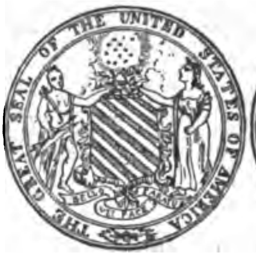
In the spring of 1779, Congress was overjoyed at the evacuation of Philadelphia and anon returned to the patriotic city to continue its important work, and again the Continental Congress began to arrange for a Committee on Great Seal. On the afternoon of Wednesday 24 March 1779, James Lovell of Massachusetts addressed the Continental Congress on the «Grand Future of the United States,» referring in the course of his speech to the grand triumph of Gates over the British at Saratoga. John Jay was the presiding officer, and he appointed Mr. Lovell of Massachusetts, with Scott of Virginia and Houston of Georgia, as a committee, requesting that they report within a fortnight. The committee immediately set to work, but the bulk of the labor fell to the hands of Chairman Lovell, who applied for artistic assistance to Du Simetière, who had done justice to the devices suggested by the former committee. After a lapse of some 10 days Lovell showed his device to his coadjutors, who highly approved of the same, and on the 10 May following the committee reported that —


THE GREAT SEAL OF THE UNITED STATES OF AMERICA
MDCCLXXVI

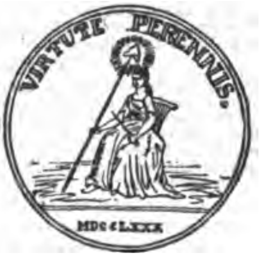
Adams' Design.

> The Seal shall be four inches in diameter; on one side the arms of the United States as follows:
>
> The Shield charged in the field with thirteen diagonal strips, alternately red and white.
>
> Supporters: Dexter, warrior holding a sword; sinister, a figure representing Peace, bearing an olive branch.
>
> The Crest, a radiant constellation of thirteen stars.
>
> The Motto: "Bello vel Pace."
>
> The Legend round the achievement. "Seal of the United States."
>
> On the Reverse: The Figure of Liberty, seated on a chair, holding the staff and cap.
>
> Motto: "Semper"; underneath, "MDCCLXXVI."

The report made a favorable impression on the members. On account of important matters demanding immediate attention, further consideration of the Seal was postponed until 17 May, when after a lengthy and heated discussion, the report was ordered to be recommitted. The committee to whom was recommitted the redevising of the proposed Seal, made their report on Wednesday, 17 May 1780, just one year


THE GREAT SEAL OF THE UNITED STATES OF AMERICA
BELLO VEL PACE

Lovell's Design (Obverse).



Lovell's Design (Reverse).

to the day, when they gave their first report. The chairman, Mr. Lovell, rose in Congress and read:

The Committee, to whom was referred, on the 17th of March last (1779), the report of a former Committee on the devices of a Great Seal of the United States in Congress assembled, beg leave to report the following description:

The Seal to be three inches in diameter, on one side the Arms of the United States as follows: The Shield charged in field azure, with thirteen diagonal stripes, alternate rouge and argent.

Supporters: Dexter, a Warrior holding in hand a bow and arrow. Sinister, a figure representing Peace, bearing the olive branch.

The Motto: "Bello vel Pace Paratus."

The Legend around the achievement: "The Great Seal of the United States."

On the Reverse: The figure of Liberty seated on a chair holding a staff and cap.

The Motto: "Virtute Perennis." Underneath, MDCCLXXX.

Much to the surprise of the committee, and especially Mr. Lovell, the Continental Congress was hard to please, and contrary to what they had expected, their report was rejected; and once more the matter of a Seal rested till months and even years rolled by. Early in April 1782, John Hanson, then president of the Confederation Congress, briefly addressed that body on the necessity of a National Seal, and appointed Henry Middleton, Elias Boudinot, and Edward Rutledge as a committee to prepare a suitable device. The committee, after a diligent search for something appropriate, finally agreed that they report substantially as the committee of 1780, and so on 9 May 1782, Chairman Middleton submitted the former designs. In consequence of Congressional dissatisfaction the entire previously submitted devices were, on 13 June 1782 referred to Charles Thomson, secretary of the Confederation Congress. On 13 June 1782, immediately after his appointment, he, in the company of Dr. Arthur Lee and Elias Boudinot, set out soliciting designs for the Seal. They had called on several prominent men of Philadelphia, requesting they should devise designs, and among those called upon was one, a young and talented graduate, Will Barton, A.M., brother of the patriotic Dr. Benjamin Barton. Young Barton unhesitatingly told Thomson, that he would diligently comply with the request, and the three missionaries left, feeling sure that an appropriate device would ripen ere the next morn. Barton at once began rummaging through his few books on heraldry, and after remaining up nearly all that night, retired believing that the question of an ideal Seal was solved. Some few days after Barton submitted the following:

Arms.— Paleways of thirteen pieces, argent and gules; a chief azure; the escutcheon placed on the breast of an American eagle (the bald-headed), displayed proper; holding in his beak a scroll, inscribed with the motto, viz.:

"E Pluribus Unum,"

and in his dexter talon, a palm or an olive branch; in the other a bundle of thirteen arrows; all proper.

For the Crest.— Over the head of the eagle, which appears above the escutcheon, a glory, or breaking through a cloud, proper, and surrounding thirteen stars, forming a constellation, argent on an azure field.

In the exergue of the Great Seal,

Jul IV., MDCCLXXVI.

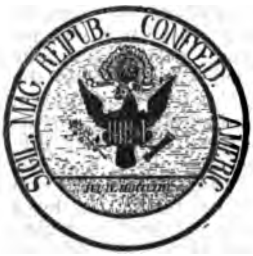
In the margin of the same,

"Sigil. Mag. Reipub. Confœd. Americ."

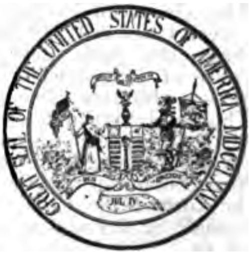
Remarks.— The escutcheon is composed of the chief and pale, the two most honorable ordinaries; the latter represents the several States, all joined in one solid compact entire, supporting a chief, which unites the whole and represents Congress. The motto alludes to the Union. The colors of tinctures of the pales are those used in the flag of the United States. White signifies purity, innocence; red, hardiness and valor. The chief denotes Congress. Blue is the ground of the American uniform, and this color signifies vigilance, perseverance, and justice.

The meaning of the crest is obvious, as is likewise that of the olive branch and arrows.

Mr. Thomson was highly pleased with Barton's device, but intimated that the design if anything was too plain, whereupon Barton offered to complete another. On 15 June Barton again called at Thomson's residence where he found the secretary, Dr. Arthur Lee and Elias Boudinot awaiting his arrival. After a few moments of verbal exchange he handed them a large drawing with the following description:


SIGIL. MAG. REIPUB. CONFOED. AMERIC.

Barton's First Design.


THE UNITED STATES OF AMERICA
JUL. IV.

Barton's Second Design.

A device for an armorial achievement for the Great Seal of the United States of America, in Congress assembled, agreeable to the rules of Heraldry, proposed by William Barton, A.M.

Arms.— Barry of thirteen pieces, argent and gules, on a canton azure, and many stars disposed in a circle of the first; a pale or, surmounted of another, of the third, charged in chief, with an eye surrounded with a glory proper; and in the fess-point an eagle displayed on the summit of a Doric column, which rests on the base of the escutcheon, both as the stars.

Crest.—Or an helmet of burnished gold damasked, grated with six bars, and surmounted with a cap of dignity, gules, turned up ermine, a cock armed with gaffs proper.

Supporters.— In the dexter side: the genius of America (represented by a maiden with loose auburn tresses), having on her head a radiated crown of gold encircled with a sky blue fillet, spangled with silver stars, and clothed in a long loose white garment bordered with green. From her right shoulder to her left side a scarf, semee of stars, the tinctures thereof the same as in the canton; and round her waist a purple girdle, fringed or embroidered, argent, with the word "Virtue," resting her interior hand on the escutcheon, and holding in the other the proper standard of the United States, having a dove argent perched on the top of it.

On the sinister side: a man in complete armor, his sword-belt azure fringed with gold, his helmet encircled with six bars, and surmounted by a red cap of dignity, two blue plumes; supporting with his dexter hand the escutcheon, and holding in the interior a lance, with the point sanguinated, and upon it a banner displayed, vert; in the fess-point a harp strung with silver, between a star in chief, two fleurs-de-lis in fess, a pair of swords in saltier, in basses, all argent. The tenants of the escutcheon stand on a scroll, on which is the following motto:

"Deo Favente,"

which alludes to the eye in the arms, meant for the eye of Providence.

Over the crest, in a scroll, this motto:

"Virtus Sola Invicta."

After thoroughly discussing the matter they agreed, that Barton had done exceedingly well, but they believed the device entirely too elaborate and complex; and also that he had failed to present them with a design of the reverse side of his proposed Seal. Mr. Barton, however, satisfied them that he would abridge the obverse, and furnish a reverse by the next meeting, which they agreed should be the following night. As per appointment he called 16 June and presented his new sketches, the description of which is as follows:

OBVERSE SIDE.

Arms: An escutcheon consisting of a blue border, spangled with thirteen white stars, and divided in the centre, perpendicularly by a gold bar; on each side of this division, within the blue border; thirteen bars or stripes, alternately white and red, like the American flag, adopted 14 June 1777. Within the Doric column a gold bar bearing a displayed eagle on its summit.

Crest: A helmet of burnished gold, and engrated with six bars, and surmounted by a red cap of dignity such as dukes wear, with an ermine lining; supporting a displayed cock armed with gaffs, in the sinister talon he held the new ensign of the Confederacy, the stars and stripes — and in the dexter talon a sword, on the point of which was suspended a wreath of laurels. Above the crest this motto:

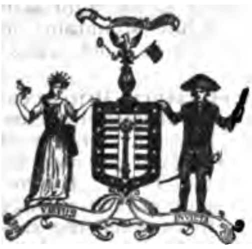
" In Vindiciam Libertatis."

Supporters: On the dexter side, the genius of America (represented by a maiden with loose, auburn tresses), having on her head a radiated crown of gold, encircled with a sky-blue fillet, and clothed in a long loose white garment, bordered with green. From her right shoulder to her left side a scarf semee of stars, the tinctures thereof the same as in the shield-border, and around her waist a blue girdle, fringed or embroidered with silver; her sinister hand rested on and supported the shield, and upon her dexter hand was perched a dove argent.

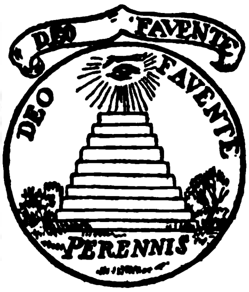
The sinister supporter was an ideal or typical American soldier dressed in a uniform peculiar to an American, with a naked sword in the hilt, on his head a felt hat, distinguishing him as an officer, with his dexter hand resting on the escutcheon, and in his sinister a wrapped roll of paper (evidently the Declaration of Independence). The tenants of the escutcheon stand on a scroll on which is the following motto: " Virtus Sola Invicta."

The entire is designated as " Great Seal of the American Confederacy." He proposed as the reverse, the following:

An unfinished pyramid, consisting of ten layers of stone. [He undoubtedly intended that there should be thirteen.] In the zenith, the eye of Providence, surrounded with a glory. Over or about the eye the Latin phrase " Deo Favente " — with God's favor. At the base of the pyramid the word " Perennis "; the former motto is the same as on his second design and the latter is taken from the device of the second committee on the Seal.



Barton's Third Design
(Obverse).



Barton's Fourth Design
(Reverse of third design).

Secretary Thomson decided he would report the first design of Mr. Barton as the obverse and his fourth design as the reverse, as follows:

The Secretary of the United States, in Congress assembled to whom were referred the several reports of committees on the device of a Great Seal to take order reports:

That the device for an armorial achievement and reverse of a Great Seal for the United States in Congress assembled, is as follows:

Arms: Paleways of thirteen pieces, argent and gules, a chief azure. The escutcheon on the breast of the American bald eagle, displayed proper, holding in his dexter talon an olive branch and in his sinister, a bundle of thirteen arrows, all proper, and in his beak a scroll, inscribed with this motto:

" E Pluribus Unum."

For the Crest: Over the head of the eagle, which appears above the escutcheon, a glory, or breaking through a cloud proper, and surrounding thirteen stars, forming a constellation, argent on an azure field.

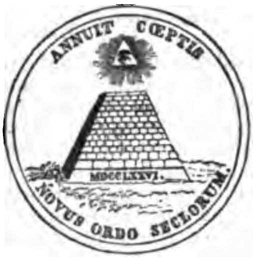
Reverse: A pyramid unfinished. In the zenith an eye in a triangle, surrounded with a glory proper. Over the eye these words:

" Annuit Coeptis."

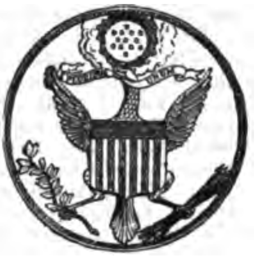
On the base of the pyramid the numerical letters MDCCLXXVI., and underneath the following motto:

" Novus Ordo Seclorum."

Thomson's report was adopted on 20 June 1782, and Congress instructed him to have the design executed in metal. Accompanying the sketch was the following definition of the Seal; this is the authentic meaning of our emblem:



Adopted Seal (Reverse).



Adopted Seal (Obverse).

Remarks and Explanations: The escutcheon is composed of the chief and pale, the two most honorable ordinaries. The pieces paly, represent the several states all joined in one solid compact entire, supporting a chief which unites the whole and represents Congress. The motto alludes to this Union. The pales in the Arms are kept closely united by the chief, and the chief depends upon that union, and the strength resulting from it for its support to denote the Confederacy of the United States of America, and the preservation of the Union through Congress.

The colors of the pale are those used in the flag of the United States of America; white signifies purity and innocence; red, hardiness and valor; and blue, the color of the chief, signifies vigilance, perseverance, and justice. The olive-branch and arrows denote the power of Peace and War, which is exclusively vested in Congress. The constellation denotes a new State taking its place and rank among sovereign powers. The escutcheoon is borne on the breast of the American eagle, without any other support, to denote that the United States of America ought to rely on their own virtues.

Reverse: The pyramid signifies strength and duration. The eye over it and the motto, allude to the many and signal interpositions of Providence in favor of the American cause. The date underneath is that of the Declaration of Independence; and the words under it signify the beginning of the new American era which commences from that date.

It has been claimed of later years, that we owe the design for our nation's mark, to Sir John Prestwick of England. That this statement has been made through carelessness and lack of thorough research on the part of our historical writers, can easily be proved; and inasmuch as we have definite authority to establish this proof let us as Americans closely stand by our American patriot, Will Barton, and give him this honor due and preserve his name among the other great benefactors of the Union. The following letter Secretary Thomson wrote Will Barton a few days after the adoption of the Great Seal, and in it there is all the evidence possible to refute the claims of the royalists. It is as follows:

Philadelphia, Penn.

MR. WILL BARTON, *Sir:*

I am much obliged for the perusal of the "Elements of Heraldry" which I now return. I have just dipped into it so far as to be satisfied that it may afford a fund of entertainment, and may be applied by a State to useful purposes. I am much obliged for your very valuable present of "Fortescue de Laudibus Legum Angliæ," and shall be happy to have it in my power to make a suitable return.

I enclose you a copy of the device by which you have displayed your skill in heraldic science, and which meets with general approbation.

I am, sir, Your obedient, humble servant,
(Signed) CHARLES THOMSON.
June 24, 1782.

In reference to the above letter Mr. Barton in after years wrote the following note, which goes to corroborate the statement, that he designed the present Great Seal of the United States:

Lancaster, Penn.

In June 1782, when Congress was about to form an armorial device for a Great Seal for the United States, Charles Thomson, Esq., then secretary, with the Hon. Arthur Lee

> and Elias Boudinot, members of Congress, called on me and consulted me on the occasion. The Great Seal, for which I furnished those gentlemen with devices (as certified by Charles Thomson, Esq.), was adopted by Congress on the 20th of June 1782. Mr. Thomson informed me four days after the design met with general approbation.
>
> (Signed) W. Barton.

Charles Thomson had the obverse side of the seal cut in brass — the reverse side was never cut or used. Strictly speaking the national documents are not sealed as the enactment calls. The first time the Great Seal was used it was found on a commission dated 16 Sept. 1782, granting full power and authority to Gen. George Washington for arranging with the British for exchange of prisoners of war. This commission is signed by John Hanson, president of the Confederation Congress, and countersigned by Charles Thomson, secretary of the same body; the seal on this document being impressed upon the parchment, over a white wafer, fastened by red wax in the upper left hand corner, instead of the lower left hand corner as is now the custom. This document is in the possession of the State Department and few papers are more carefully stored or more highly cherished. The seals of many of our States contain emblems borrowed from the «Great Seal.» This is also true of many of the seals of government departments. The historic and much admired china set of the White House has the Great Seal blazoned upon every piece,— the seal being in heraldic tinctures. The Great Seal of the United States being used very frequently, its wear of necessity is great and several secretaries of State had it retouched and corrected. Officially the Great Seal has been changed in Webster's term, in Frelinghuysen's term and in John Hay's term.

In 1841, during the administration of President Tyler, it was found by Webster, then Secretary of State, that the Seal was badly worn and beyond the engraver's power of redemption. The President then ordered that Webster see that a new Seal be engraved. The engraver, it seems, found it difficult to engrave the bundle of 13 arrows, and with Webster's advice and consent agreed that six arrows would suffice.

Second Great Seal — 1841 (Webster's).

Present Great Seal.

In 1885, during the administration of Chester A. Arthur, Mr. Frelinghuysen, the Secretary of State, found that the Great Seal was badly worn and beyond restoration. The secretary consulted Mr. Arthur, who ordered that a new Seal be executed. This Seal also lacks the true heraldic significants. In 1903 Secretary John Hay's attention was called to the lapses in the execution of the Seal, and President Roosevelt ordered that a new one be made. The present Seal is a beautiful emblem and is considered the most artistic «hand mark» of the nations. See Seal.

Bernard J. Cigrand,
Author of 'History of American Emblems.'

GREAT SERPENT MOUND. See Mound Builders and Mounds.

GREAT SLAVE LAKE, a body of water in the Canadian Northwest Territory, lat. 62° N., greatest length about 300 miles, greatest breadth 50 miles. Estimated area, 10,100 square miles. By the Great Slave River it receives the waters of Lake Athabasca; and the outlet is the Mackenzie River which flows into the Arctic Ocean.

GREAT SLAVE RIVER, in Alberta and the Northwest Territories, Canada, is the outlet of Athabasca Lake and flows into Great Slave Lake (q.v.), by two mouths, near Fort Resolution. A number of falls and rapids are in its upper course, but the descent becomes more gradual near its mouth. It is navigable for the greater part of its course. Length about 300 miles.

GREAT SOUTH BAY, an arm of the Atlantic Ocean on the southern coast of Suffolk County, Long Island, N. Y.; 50 miles long, from one and one-half to five miles wide. Great South Beach, which is about 35 miles long, has Fire Island lighthouse on the western extremity, and separates the bay from the ocean.

GREAT STONE FACE, one of Hawthorne's short stories relating to the «Old Man of the Mountain» in the White Mountains, in 'Snow Image and Other Twice Told Tales' (1852).

GREATHEAD, James Henry, British engineer and inventor: b. Grahamtown, Cape Colony, 1844; d. London, 1896. At the age of 15 he went to England, and later pursued his studies in engineering under P. W. Barlow. His principal work is in underground railway systems for city traffic. He designed the subway near the Tower under the Thames, London (1869); and in 1886 by using the Greathead shield, succeeded in constructing the tunnels for the city and South London Railway. Among his private inventions is the Ejector fire hydrant. He also is responsible for the introduction of the Hallidie cable system into England.

GREATHEART, Mr., the guide of Christiana and her children to the Celestial City in Bunyan's 'Pilgrim's Progress.'

GREATOREX, grāt'ō-rěks, **Eliza Pratt,** American artist: b. Manor Hamilton, Ireland, 25 Dec. 1819; d. Paris, 9 Feb. 1897. She studied art in New York and Paris. Her work began in landscape painting but pen and ink work and etching subsequently absorbed her efforts. In 1868 she was elected associate of the National Academy. In 1870 she visited Germany and in 1871 published 'The Homes of Oberammergau.' Her principal works are 'Summer Etchings in Colorado' (1873) and 'Old New York from the Battery to Bloomingdale' (1876).

GREBES, grēbz, a well-defined group of water-bird (*Colymbidæ* or *Podicipidæ*) comprises 25 species, spread over practically the whole world. The grebes are peculiar in having the legs placed very far back, in their flattened tarsi and lobed (not webbed) toes, each digit being flattened and bordered by an extension of horny skin. They are expert swimmers and pre-eminent as divers. They nest in secluded ponds and bogs, piling up a mass of vegetable matter upon some floating foundation, and deposit chalky white eggs. When the female leaves the nest she usually covers the eggs over with vegetable matter. The little grebes are expert swimmers and divers from the time they are hatched, and in their soft downy plumage are exceedingly beautiful. During migrations grebes are found frequently along our rivers and sea coasts, and are often shot by duck hunters in the autumn and winter. Though they have no stiffened tail feathers, and have relatively very small wings, they are able to fly long distances. The body plumage is soft and compact, and that of the under surface is a beautiful silvery white, which makes «grebe-breasts» a very desirable article in the millinery trade. The best-known species in eastern North America are the horned grebe (*Colymbus auritus*) which has a peculiar ruff of black and rusty feathers about the head; and the pied-billed grebe (*Podilymbus podiceps*) a rather more heavily built bird without a ruff and with a thicker and shorter bill. Both are popularly known as «hell-divers.» In Europe the common species are the horned grebe, the great crested grebe (*C. cristatus*) and the dabchick (*C. fluviatilis*).

GRECHANINOV, grĕ-chȧ-nī'-nôf, **Alexander Tikhonovich**, Russian composer: b. Moscow 1864. He studied under Safanov at the Moscow Conservatory and at Petrograd under Rimsky-Korsakov. He is well known for his sacred compositions in his own country; although his lyric and instrumental works have attracted wider notice elsewhere. His works include two symphonies, two string quartets and the music to Ostrovsky's 'Snegowruchka'; Tolstoy's 'Tsar Feodor' and 'Tsar Boris,' besides numerous songs and studies for the pianoforte. Of special dramatic merit are his two operas 'Dobrinya Nikitich' (1903) and 'Soeur Beatrice' (1912).

GRECIAN ARCHIPELAGO, a group of islands lying in the Ægean Sea, many of which are of volcanic origin. Others are composed entirely of pure white marble, their mountain elevation having an average height of from 1500–1800 feet. Among the better known of these islands are Eubœa, Chios, Lesbos, Lemnos, Andros, Naxos, Samos and Skyros. Rhodes and Carpathos (Scarpanto) lie at the southeast entrance to the sea. Of strategic importance in all historic times, they again came into prominence when, on 10 April 1917, the British and French Ministers informed the Greek government of their intention to create naval bases at certain points in the Ionian Islands and the Ægean, and shortly afterwards the harbor of Arghostolion in Kephallinia was occupied, this action being the precursor of many similar ones. See WAR, EUROPEAN.

GREECE, Ancient, the European peninsula which was bounded on the north by Macedonia and Illyria; on the east and southeast by the Ægean and Myrtoan, and in the west and southwest by the Ionian seas. Its length from the borders of Macedonia to Cape Tænarum was about 262 miles. The name of *Græcia* originated in Italy and was probably derived from Pelasgian colonists, who, coming from Epirus to Magna Græcia, in southern Italy and calling themselves *Græci*, occasioned the application of this name to all the people who spoke the same language with them. In earlier times, for example, in the time of Homer, Greece had no general name among the natives. Aristotle was the first Greek to call his countrymen Γραικοί, Greeks. It afterward received the name of *Hellas*, and still later, after the country was conquered by the Romans, it was divided into two provinces: the Peloponnesus being known as Achaia and the remaining regions to the north as Macedonia. The Grecian tribes were so widely dispersed that it is difficult to determine with precision the limits of Greece, properly so called. The name perhaps is properly applied only to the country lying to the south of Macedonia with the adjacent islands; but it has sometimes been given in a modern sense by geographers to the whole territory lying to the south of Mount Hæmus, Mount Scomius and the Illyrian Alps, or the whole series of mountains now called the Balkan, so as to include regions inhabited by some Thracian, Macedonian and Illyrian tribes. The area of the mainland of the more limited region to which the name of Hellas is properly confined is above 55,000 square miles. The whole of Greece naturally divides itself into three parts: Northern Greece, including Epirus and Thessaly; Central Greece, which comprises what was known as Hellas; and the Peloponnesus.

Physical Features.— The first thing which strikes the eye on looking at a map of Greece is the comparatively great extent of its coastline, formed by numerous gulfs which penetrate into it in all directions and give it a remarkably broken and rugged appearance. Proceeding round the coast from the northwest to the northeast we are presented in succession with the Ambracian Gulf (now Gulf of Arta), Corinthian Gulf (the mouth of which is now called the Gulf of Patras, while the name of Gulf of Corinth is reserved for the inner part of it), the Cyparissian (now Arcadian) Gulf and the Messenian, Laconian, Argolic, Saronic, Maliac and Pagasæan gulfs, now called respectively Koron, Marathon, Nauplia, Athens, Lamia and Volo. The Corinthian Gulf on the east and the Saronic Gulf on the west which nearly meet at the Isthmus of Corinth divide Greece into a continental and a peninsula portion, the latter called the Peloponnesus (now Morea). Another striking feature is the mountainous character of the interior. The whole country was bounded on the north by a range of mountains, the western half of which was called Mount Lingon and the eastern half the Cambunian Mountains, with Mount Olympus at their eastern extremity. From about the middle of this range a lofty chain, called Mount Pindus, strikes southward and runs almost parallel to the eastern and western coasts of Greece. At a point in this chain called Mount Tymphrestus or Typhrestus (now Mount Velukhi), two chains proceed in an easterly direction, the northernmost of which, Mount Othrys, runs almost due east and attains at some points a height of from 7,000 to 8,000 feet, while the southern one runs rather in a southeasterly direction, attaining at one point a height of 8,240 feet and terminates at the celebrated pass of Thermopylæ. The Cambunian Mountains on the north, the range of Pindus on the west and Othrys on the south, enclose the large and fertile vale of Thessaly, forming the basin of the Peneus (now Salambria), and the ranges of Othrys and Œta enclose the smaller basin of the Sperchius (Hellada). Another range of mountains branches off from Mount Œta and runs still more to the south. This is the celebrated Parnassus, which, at its highest point, exceeds 3,000 feet. The peaks of Cithæron, Parnes, Pentelicus and Hymettus lie in the same direction, but are more distinguished for their classic celebrity than for their height. The range in which these peaks are found is continued to the southeast point of continental Greece, and the islands of Ceos, Cythnos, Seriphos and Siphnos (now Kea, Thermia, Serpho and Siphanto) may be regarded as continuations of it. This range on the south and that of Œta on the north enclose the basin of the Cephissus, with Lake Copais (now Topolia). Another chain of mountains strikes southwestward from the central range of continental Greece under the names of Corax and Taphiassus. The chief rivers on the west side of the Pindus chain are the Arachthus (now Arta) and the Achelous (now Aspropotamo).

The chief feature in the mountain system of the Peloponnesus is a range or series of ranges forming a circle round the valley of Arcadia in the interior, having a number of branches proceeding outward from it in different directions, dividing the rest of the Peloponnesus into several other valleys. The loftiest part of the montainous circle round Arcadia is that lying to the north, with the peak of Cyllene (Ziria), 7,789 feet high, at its eastern extremity, and Erymanthus (Olonos), 7,297 feet high, at its western. The southern part consists rather of a series of heights than a chain of mountains. The highest range which branches off from the circle around Arcadia, and, indeed, the highest range in the Peloponnesus, is Mount Taygetus (Pentedactylon), which strikes southward, separating the ancient divisions of Messenia and Laconia and terminating in the promontory of Tænarum (now Cape Matapan). The other chains are of no importance. The only rivers in the Peloponnesus of any consequence are the Eurotas (Iri), draining Laconia on the southeast; the Pamisus (Pirnatza), draining Messenia on the southwest; the Alpheus (Ruphia), draining Arcadia and Elis; and the Peneus (Gastuni) draining Elis on the west.

The rock most largely developed in the mountains of Greece is limestone, which often assumes the form of the finest marble. Granite and gneiss are found only in the north, in the eastern ramifications of the Pindus. Tertiary formations prevail in the northeast of the Peloponnesus; and in the northwest, along the shores of Elis, are considerable tracts of alluvium. Volcanic rocks are not seen on the mainland, but form considerable masses in some of the islands. Attica was rich in silver and marble. The quarries of Pentelicus and the mines of Laureium were famous. Gold and serpentine were found in Siphnos; there was tin in Ceos and copper near Chalcis in Eubœa. In many of the islands iron abounded.

Divisions.— On the northwest of the mainland of Greece was the mountainous region of Epirus, which was never more than half Greek; and to the east of that district, separated from it by a chain of Pindus, lay Thessaly, a region of fertile plains. To the south, lay a series of small independent states. Reckoned from west to east, there were Acarnania, Ætolia, Doris and Locris, Phocis with Mount Parnassus, the seat of the Muses and the sacred Delphi, regarded by the Greeks as the navel of the earth; Bœotia, with Helicon, another mountain sacred to the Muses, and with the cities of Thebes and Platæa; Megaris, containing the city of Megara; and Attica with its capital Athens, Piræus, the port of Athens, and the city of Eleusis, the seat of the mysterious worship of Demeter. In the middle of the Peloponnesus was Arcadia, with the towns of Mantinea, Tegea and Megalopolis, the last founded by Epaminondas. In the north lay Sicyon and Corinth, the latter situated on the isthmus connecting the Peloponnesus with the rest of Greece; and to the west of that Achaia. To the southwest of Achaia lay the rich province of Elis, with the plain and sacred grove of Olympia, celebrated on account of the Olympic games, which were held there every fourth year. To the south of Elis in the southwest corner of the Peloponnesus, lay the province of Messenia, with the famous stronghold of Ithome, "one of the horns of the Peloponnesus," the fort of Pylos, and later the capital town of Messene, founded by Epaminondas 369. Separated from Messenia by the range of Taygetus was the province of Laconia, occupying the southeast corner of the Peloponnesus and containing the renowned city of Sparta, long the rival and ultimately the conqueror of Athens. Lastly, to the north of Laconia, the east of Arcadia and the south of Sicyon, lay the province of Argolis, with the capital Argos, and the cities of Mycenæ and Tiryns, all remarkable for the remains of gigantic works of masonry, commonly known as Cyclopean works.

The islands of Greece are partly scattered over the Ægean Sea and partly contained in the Ionian Sea on the southwest of the mainland. The Greeks applied the names Cyclades and Sporades to two groups of islands in the Ægean, the former name (from *kuklos*, a circle) to those which they believed to form a circle round the sacred island of Delos, and the latter (from a Greek root meaning scattered, sporadic) to those which were scattered over various parts of the sea. Some islands were sometimes said to be in the one group and sometimes in the other, and several were sometimes excluded from both. The following, however, are the principal of those which may most properly be considered as belonging to the Cyclades: Andros, Tenos, Myconos, Naxos (now Naxia), Paros (celebrated for its marble), Amorgos, Anaphe, Thera (now Santorin), Pholegandros (now Polykandro), Sicinos, Ios (now Nio), Melos, Syros and Gyaros (Jura), Siphnos, Seriphos, Cythnos and Ceos. The name Sporades may be applied to all the other islands in the Ægean. The Sporades will thus include the following islands on the northeast of the mainland of Greece: Eubœa (Negropont), the largest of all the Greek islands, separated from the continent only by the narrow strait of Euripus and containing the ports of Chalcis and Eretria; Sciathos, Scopelos, Halonesus (Kilidromi), Eudemia (Sarakino) and Scyros; the following off the coasts of Thrace and Asia

Minor: Lemnos, Thasos, Imbros and Samothrace (in very remote times the seats of a mysterious religous worship) Lesbos (with the flourishing and luxurious town of Mitylene), Chios, Samos, Cos, etc.; and the following in the Saronic Gulf, or between it and the Argolic Gulf: Salamis (now Salamis or Koluri), Ægina, Calauria (Poros), Hydrea (Hydra) and Pityussa (Spetsæ). The islands in the Ionian Sea are Corcyra (Corfu), celebrated in the most ancient times for its wealth and culture, and at a later period colonized by Corinthians; Paxos, Leucas or Leucadia (Santa Maura), at one time connected with the mainland; the "rocky" Ithaca (now vulgarly called Ithaki), the home of Ulysses; Cephallenia (Cephalonia), Zacynthus (Zante) and Cythera (Cerigo), one of the seats of the worship of the goddess Aphrodite.

Soil, Productions, Etc.— Greece was in ancient times more fertile than it is now, which is accounted for by the fact that the forests have been to a large extent cleared away, the springs thus dried up, and the soil deprived of moisture. The most fertile districts were Thessaly, Bœotia and some parts of the Peloponnesus; the least fertile Attica and Arcadia. The principal objects of cultivation were the vine and the olive, but flax and the commoner cereals were also cultivated more or less. Among the domestic animals were horses, asses, mules, oxen, swine, sheep, goats and dogs. Swine were very numerous everywhere and mules were much used in the Peloponnesus; but there were comparatively few horses, as the mountainous character of the country was not conducive to their being reared; the best horses of Greece were reared in Thessaly. Bears, boars and wolves are mentioned among the wild animals anciently found in Greece, and it may perhaps be inferred from the legend of the Nemean lion that even lions at one time existed in this country. Herodotus, indeed, expressly states that lions were found between the Nestus in Thrace and the Achelous in Acarnania.

Climate.— The climate of ancient Greece is highly commended by ancient Greek writers, as by Herodotus, Hippocrates and Aristotle, on which account it seems fair to infer that the malaria which now infests the air in summer did not then prevail to the same extent, a circumstance that is easily accounted for by the fact that in those times the country was more thickly populated and better cultivated. In respect of temperature the same differences resulting from the inequalities of the surface must have existed then as exist now, long and severe winters being experienced in the highlands of the interior, while the lowlands, exposed to the sea, enjoyed warm and genial weather all the year round.

History.— Greece has never at any period formed a single and independent state. As long as it remained independent it was divided into a number of separate states, and during the only period when it was administered as a single territory it was subject to a foreign power. A general sketch of the history of ancient Greece must therefore touch only upon those leading events which belong to the common history of the Greek states, or which at least affected the Greek people as a whole, even although they may belong more especially to the history of an individual state.

The earliest inhabitants of Greece of whom anything is known are called by Greek writers Pelasgians. The ethnological affinities of these have often been discussed, but the most recent authorities believe that they were an Indo-Germanic or Aryan people. They occupied Greece before the influx of Ionians, Æolians and Dorians. They seem to have been agricultural in pursuits, dwelt along the fertile valleys, built strong cities, walls of the so-called cyclopean masonry, and among their most famous seats were Dodona in Epirus, Thessaly, Orchomenos in Bœotia, Mycenæ in Argolis, Sicyon, etc.

In religion they abhorred both polytheism and anthropomorphism. Their name afterward became changed to Hellenes and under this appellation they amalgamated with the Ionians, the Achæans, the Æolians and the Dorians. The early relations of Greece with the East are perhaps reflected in the legends of Oriental colonists — Cadmus, Pelops, Cecrops, etc.— who settled in Greece in very remote times. The reality of an early connection between Greece and the East is established by the fact that the Greeks derived the greater part of their alphabet from the Phœnicians.

The Hellenes, or Greeks properly so called, entering the country probably from the northwest, subdued and partly displaced the Pelasgians. They are usually represented as having been divided into four chief tribes — the Æolians, occupying the northern parts of Greece (Thessaly, Bœotia, etc.); the Dorians, occupying originally only the small region in the neighborhood of Mount Œta; the Achæans, occupying the greater part of the Peloponnesus; and the Ionians, occupying the northern strip of the Peloponnesus and Attica. The middle part of the Peloponnesus was still mainly inhabited by a Pelasgic population. The warlike and enterprising character of these Hellenic invaders is evidenced by the poetic legends of their achievements in the heroic ages, such as the tale of the Trojan War, of Theseus, of Jason and the Argonauts, etc. From all these we may gather at least that the Hellenes early distinguished themselves by building towns, making long voyages, planting distant settlements and carrying on foreign wars. As in later times, they were divided into numerous states, each consisting of a single city with the surrounding territory. These states were governed by kings who were the heads of the supreme families and who traced their descent from Zeus. By the side of the kings stood the heads of the other leading families of the state, who in Homer are also called kings and likewise boasted of a descent from Zeus. In the public market-place (agora), where all the affairs of the state were transacted, these subordinate kings gave their opinions on every subject of deliberation and advised the supreme ruler as to the course he should pursue, but beyond that they had no authority. Their influence, however, was very great, especially where the rightful head of the state did not possess the abilities of a ruler.

The distribution of the Hellenic tribes which we have just indicated is not that which continued throughout the main period of Greek history. It was entirely altered by an event called the Dorian migration, or sometimes the return of the Heracleids, which is placed by Thucydides about 80 years after the fall of

Troy and thus about the year 1104 B.C., according to the ordinary system of chronology. Before the great migration several smaller ones had taken place. One tribe, finding its territory too circumscribed, would move to another, expelling the inhabitants already settled there, who thus found themselves compelled to remove to some other district, where they treated the original inhabitants in the same way that they had been treated themselves. In this way there arose a general disturbance, till at last the hardy Dorian inhabitants of the mountainous region about Mount Œta began a migration on a greater scale than had hitherto been attempted, and thus brought about a series of changes which resulted in an entirely new settlement of the Greek territory. They first conquered a large part of northern Greece and then entered and subdued the greater part of the Peloponnesus, driving out or subjugating the Achæans, as the Achæans had driven out or subjugated the Pelasgians. The Dorians are also said to have invaded Attica, where, however, they were baffled, according to the legend, by the self-devotion of Codrus, the king of that territory. It is said that an oracle had pronounced that in this war whichever side lost its king would be victorious, on which account strict orders were given to the Dorian soldiers to spare the life of the king of enemy. But Codrus disguised himself in the dress of a common herdsman, and going into the enemy's camp provoked a quarrel in which he met his death, on learning which the Dorians despaired of success and withdrew. In the legend in which this series of events has come down to us the Dorians are represented as having entered the Peloponnesus under Temenus, Cresphontes and Aristodemus, three descendants of Heracles, who had come to recover the territory of which their ancestors had been unjustly deprived by Eurystheus. Hence the name of the Return of Heracleids, sometimes given to this event.

The Achæan inhabitants of the Peloponnesus whom the Dorians found there had a threefold fate. One part of them sought for new homes and turned their steps toward the part of the Peloponnesus occupied by the Ionians, whom they expelled, keeping for themselves their territory, which hence received the name of Achaia. Another part voluntarily submitted to the invaders, who imposed tribute upon them and excluded them from all share in the government; while a third part resisted to the last and were in the end reduced to the condition of slavery. In Laconia the former received the name Periœci (dwellers round) and the latter were called Helots.

The Ionians who were driven out of the Peloponnesus found at first a refuge among their kindred in Attica, but when this district did not suffice for all the inhabitants, old and new, large numbers of them left it and founded Ionic colonies on several of the islands of the Ægean Sea and on the middle part of the coast of Asia Minor, where they built 12 cities, which formed an Ionic Confederacy. The principal of these were Ephesus and Miletus. About the same time as the Ionians are said to have colonized the middle part of the seaboard of Asia Minor, another body of Greeks, proceeding from Thessaly and Bœotia, are said to have founded the Æolian colonies on some of the northern island of the Ægean, and on the northern part of the western coast of Asia Minor. The Æolic colonies of Asia Minor also formed a confederacy of 12 cities, but the number was afterward reduced to 11 by the accession of Smyrna to the Ionic Confederacy. While Ionians and Æolians thus colonized the middle and northern islands of the Ægean and coasts of Asia, the southern islands and the southern part of the west coast of Asia Minor were in like manner colonized by the Dorian settlers. The six Doric towns in Asia Minor, along with the island of Rhodes, formed a confederacy similar to the Ionic and Æolic ones.

In considering the subject of Greek colonization we are brought face to face with the fact that in settling in foreign lands, the Greek races kept distinct from each other. One of the great keys to an understanding of Greek history is a right understanding of the relation between the two great races of the Greek name, the Dorians and Ionians. The Dorians were inland mountaineers, the Ionians were of the seacoast. The former, as represented in the institutions of Sparta, were a practical and conservative race, living a simple and unimaginative life. Their poetry was the public ode, accompanied with the dance in the market-place, often carried on under arms. The Ionians were versatile, imaginative, impressible. They were devoted to the maritime life, were travelers and fond of welcoming strangers to their cities. They were traders. Moreover, they were keenly intellectual and reached the summit of excellence in art, literature and philosophy. Their poetry was the epic narrative; and they invented the drama, in which the Ionian tale of personal adventure was united with the Doric ode. These two contrasted races between them swayed the fate of Greece. Their relations were complicated by the different colonies which they established at different points on the Mediterranean and Euxine coasts. In the course of time new Greek settlements were made on the coasts of the Hellespont, the Propontis (Sea of Marmora), and the Black Sea by both Dorians and Ionians. The most important of these were Byzantium (Constantinople) (Dorian), Sinope (Ionian), Cerasus (Ionian) and Trapezus (Trebizonde) (Ionian). Further, there were flourishing Greek colonies on the coasts of Thrace and Macedonia; for example, Abdera, Amphipolis, Olynthus, Potidæa, etc., which were all Ionian; and the Greek colonies in Lower Italy were so numerous that the inhabitants of the interior spoke Greek, and the whole region received the name of Greater Greece. The most famous of the Greek colonies in this quarter were Tarentum, Sybaris, Croton, Cumæ and Naples. The island of Sicily also came to a great extent into the hands of the Greeks, who founded on it or enlarged many towns. By far the largest, most powerful and most highly cultured of the Greek colonies was the Dorian colony of Syracuse, founded in the 8th century B.C. On the north coast of Africa the Dorian colony of Cyrene rivaled in wealth and commerce the city of Carthage; and on the south coast of Gaul Ionian Massilia (Marseilles) presented a model of civilized government to the inhabitants of the surrounding districts. All these towns kept up a commerce in the products of the land in which they were planted. They exerted a most important and beneficent influence on the manners of the neighboring inhabitants. They preserved the customs and institutions of their mother city, which they regarded with filial reverence; but otherwise they were perfectly free and independent.

Although ancient Greece never formed a single state, the various Greek tribes always looked upon themselves as one people, and classed all other nations under the general name of *Barbaroi* (foreigners). There were four chief bonds of union between the Greek tribes. First and chiefly they had a common language, which, though it had considerable dialectic peculiarities when spoken by different tribes, was yet understood throughout every part of Greece and in all the Greek colonies. Secondly, they had common religious ideas and institutions, and especially in the oracle of Delphi (q.v.) they had a common religious sanctuary, which was held by all the states in equal reverence, and was resorted to from all parts of Greece, alike by communities and individuals, for advice in circumstances of difficulty, and not unfrequently for indications as to the future. Thirdly, there was a general assembly of the Greeks called the Amphictyonic League, in which the whole nation was represented by tribes (not by states), and the chief functions of which were to guard the interests of the sanctuary of Delphi, and to see that the wars between the separate states of Greece were not carried on in too merciless a manner. When any of the ordinances of the league were violated it was its duty to see that the violators were punished, and to entrust the infliction of the punishment to some one of its members. The fourth bond of union between the tribes of Greece consisted in the four great national festivals or games, the Olympian, Isthmian, Nemean and Pythian (qq.v.) which were held at different intervals in four different parts of Greece, in which all Greeks, and none but Greeks, were allowed to participate, and which slaves were not allowed even to witness. At these games contests took place in foot-racing and chariot-racing, boxing, wrestling and throwing with the quoit (or discus), and prizes were also awarded for works of art, poems, dramas, histories, etc. The prize was a simple wreath of olive or pine branches, or of parsley; but such a prize brought glory not only on the winner himself, but on his whole family and kindred, and even on the state to which he belonged. The victor was welcomed home by a triumphal procession, and his victory was celebrated in odes sung on the occasion, and sometimes composed by such poets as Simonides and Pindar. The Olympic games were the most celebrated of these festivals. They were held in the summer once every four years at Olympia, in Elis; the month in which they were held was considered as sacred, and during it no acts of hostility were allowed to take place between any of the Greek states. Originally, the only contest was a foot-race, and so high was the honor of a victory in this race esteemed, that from that of Corœbus in 776 B.C. the whole of Greece reckoned the time. The year in which any event happened was styled the first, second, third or fourth year of a certain Olympiad, the name given to the interval elapsing between each celebration.

The various small states of Greece may be divided, according to the form of their constitution, into the two great classes of aristocratic and democratic. Sparta or Lacedæmon, the chief town of Laconia and of the Dorians, was the leading aristocratic state; and Athens, the capital of Attica and the chief town of the Ionians, was the leading democratic state; and as a rule all the Doric states, and subsequently all those under the influence of Sparta, resembled that city in their constitution; and all the Ionic states, and those under the influence of Athens, resembled it. These two races are the only ones that come into prominence during the earlier part of Greek history subsequent to the Doric migration. Sparta is said to have derived its form of government, and all its institutions, near the close of the 9th century B.C., from Lycurgus, who made minute regulations as to the course of education and the mode of life among the Spartans. He had but one object, that of training the Spartan youth for war, and developing a hardy and warlike spirit among the people. The immediate results of this training were seen in the conquests which the Spartans effected over the surrounding states, especially over the Messenians in the 8th and 7th centuries B.C. Many of the vanquished Messenians left their native country and founded the city of Messana in Sicily. Those who remained were reduced to the condition of Helots (q.v.).

The constitution of Athens was not originally democratical, but monarchical. Afterward it became aristocratic, and first received a more or less democratic constitution from Solon at the beginning of the 6th century B.C. This was followed about 50 years later by a despotic monarchy under the celebrated "tyrant" Pisistratus, and his sons, Hippias and Hipparchus, the last survivor of whom, Hippias, reigned in Athens till 510 B. C. Hipparchus had been assassinated four years before; and the last four years of the reign of Hippias were distinguished by violence and cruelty. His enemies drove him from Athens, after which the republic was restored in a more purely democratic form than at first.

Hippias found refuge at the court of the king of Persia, with whose aid he hoped to be able to return and rule once more in Athens. The Persian monarchy had been established about 30 or 40 years before by Cyrus the Great, and its sway extended not only over the whole of Persia, Media and Babylonia, but also over Egypt and Asia Minor. With the rest of this last-mentioned territory the Greek colonies on the coast had been brought under the yoke of this empire, and although they chafed under the foreign dominion, they were kept in subjection by the native princes or tyrants whom the Persian monarch imposed on them as governors. One of the most powerful of these governors was Histiæus of Miletus, whose behavior had excited the distrust of Darius, the Persian king, for the latter, on the pretence of rewarding him for a signal service invited him to his court and kept him at Susa in practical captivity. Histiæus secretly incited his relative, Aristagoras of Miletus, to get up a rising among the Greek colonies of Asia Minor, in the hope that he might, during the disturbance, find an opportunity of returning to his home. The endeavors of Aristagoras were successful; all the Greek towns on the coast were soon in arms, and assistance was asked from the mother country. Only Athens, which feared lest Darius should re-establish Histiæus, and the small Ionian town of Eretria in Eubœa, furnished any aid. The Greeks, in 496 B.C., conquered and burned the town of Sardis, the capital of Asia Minor, whereupon the rebellion extended over the whole of Ionia. But the superior forces of the enemy, and the want of union among the insurgents, led in the following year (495) to the loss of a naval battle, and soon after to the destruction of Miletus, the inhabitants of which were partly put tó death and partly made captives.

Darius now determined to avenge himself on the Athenians and Eretrians for the part that they had taken in the rising. In 492 he sent out an expedition against them under his son-in-law Mardonius, but the Persian fleet was wrecked off the promontory of Mount Athos. Darius had at the same time despatched heralds to the islands and states of Greece to demand earth and water in token of submission. Most of the islands and many of the smaller states yielded, but Athens and Sparta indignantly refused the demand, and even went the length of putting the heralds to death. Enraged at this insult Darius equipped a second fleet and placed it under the command of Datis and Artaphernes. But this met with no better fate than the first. The Persians landed on the island of Eubœa, and after destroying Eretria, crossed the Euripus into Attica; but here they were met (490 B.C.) on the plain of Marathon by 10,000 Athenians and 1,000 Platæans, under Miltiades, and, although 10 times as numerous, were totally defeated and pursued to their ships. This battle put an end to the second Persian expedition, but Darius at once began to make preparations for a third expedition, and this time on a far greater scale than before. In the midst of these preparations he died, but his son Xerxes, collected an army of 1,700,000 men and a fleet of 1,200 large ships besides a number of smaller ones, crossed the Hellespont in 481 by means of two bridges of boats, and led his army through Thrace, Macedonia and Thessaly, while his fleet followed the line of coast. Thessaly had surrendered without a stroke, and Xerxes at once pursued his march in the direction of Phocis. But before he could enter this territory he had to make his way through the narrow and difficult pass of Thermopylæ, and this had previously been occupied by 300 Spartans under Leonidas, along with several thousand allies. Here Xerxes in vain attempted to force a passage against a mere handful of Greeks; thousands of his troops were slain; and it was only after Ephialtes had betrayed to the Persians a foot-path which led over the heights of Œta to the rear of the defenders of the pass, that the Persian king effected his purpose. Leonidas allowed all the allies to depart while he himself and his 300 Spartans, along with 700 Thespians who voluntarily remained with them, held out until they were completely annihilated (480 B.C.).

The way through Phocis and Bœotia was now open to the Persians, who advanced into Attica, and laid the city of Athens in ruins, putting to death the small garrison. The women and children belonging to Athens had by this time, on the advice of Themistocles, been removed to Salamis, Ægina, and Trœzen, while all the men capable of bearing arms served in the fleet. It was to Themistocles that the deliverance of Greece was now chiefly due. The united fleet of the Greeks had already contended with success against that of the Persians off the promontory of Artemisium, in Eubœa, and had then sailed into the Saronic Gulf, whither it was followed by the enemy. In this confined arm of the sea, where there was no room for the manœuvring of the numerous ships of the enemy, a decisive battle between the two fleets took place with the result that Themistocles had anticipated, the total defeat of the Persians. This battle is known as the battle of Salamis, from the name of an island in the Saronic Gulf, and was fought in the same year as Thermopylæ (480 B.C.) Xerxes himself had been an eye-witness of the battle and at once began a speedy retreat with his land army through Thessaly, Macedonia and Thrace, a retreat which Themistocles had hastened by causing the false report to reach Xerxes, that it was the intention of the Greeks to destroy the bridges of boats over the Hellespont. Xerxes left behind him only 300,000 men in Thessaly. In the spring of the following year (479) these advanced into Attica and compelled the citizens once more to seek refuge in Salamis; but in the battle of Platæa the Greeks, under the command of Pausanias, obtained so complete a victory that only 40,000 of the Persians reached the Hellespont. On the same day the remnant of the Persian fleet was attacked and defeated by the Greeks off Mount Mycale, near Samos on the Ionian coast of Asia.

By the brilliant part which the Athenians under Themistocles had played against the Persians, the influence of Athens had greatly increased throughout Greece; and this was further strengthened by the fact that the war against Persia, which still continued, was chiefly conducted by sea, where Athens was much more powerful than Sparta. From this date then begins the period of the leadership or *hegemony* of Athens in Greece, which continued to the close of the Peloponnesian war, 404 B.C. Athens now exerted her influence to form a confederacy including the Greek islands and maritime towns as well as Athens herself, the object of which was to provide for the continuance of the war by the payment into a common treasury at Delos of a fixed sum of money, and by furnishing ships for the same purpose. In this confederacy Athens of course had the lead, and gradually was able to render tributary many of the islands and smaller maritime states. In 469 B.C. the victories won by the Athenians over the Persians was crowned by the double victory of Cimon, the son of Miltiades, over the fleet and army of the Persians on the river Eurymedon, in the south of Asia Minor; and this victory was followed by the Peace of Cimon, which secured the freedom and independence of all Greek towns and islands. Shortly after followed the brilliant administration of Pericles, during which Athens reached the height of her political grandeur, while at the same time she flourished in trade, in arts, in science and in literature.

The position of Athens, however, soon raised up a number of enemies. Sparta regarded her prosperity with jealousy; and the arrogance of Athens had produced a pretty general feeling of indignation and hatred. Two hostile confederacies were formed in Greece. At the head of one of these confederacies was the city of

Athens, which was joined by all the Ionian states of Greece, and more or less supported by the democratic party in every state. At the head of the other confederacy stood Sparta, which was similarly joined by all the Dorian states, and supported by the aristocratic party everywhere. At last in 431 war was declared by Sparta on the complaint of Corinth that Athens had furnished assistance to the island of Corcyra in its war against the mother city; and on that of Megara, that the Megarean ships and merchandise were excluded from all the ports and markets of Attica.

In the first part of the Peloponnesian War the Spartans had considerable successes, while a great calamity befell the Athenians, who had collected all the inhabitants of the country districts of Attica within the walls of the city; and in consequence a pestilence broke out which carried off thousands of the inhabitants, and among them Pericles himself. From this blow, however, the city soon recovered, and in 425 the early successes of the Spartans in Attica were compensated by the capture of Pylos in Messenia by the Athenian general Demosthenes, who at the same time succeeded in shutting up 400 Spartans in the small island of Sphacteria, opposite Pylos, where they were ultimately starved to surrender. The person to whom the surrender was made was the demagogue Cleon, who, in consequence of his military successes, obtained the command of an army which was sent to operate against the Spartan general Brasidas in Thrace. But in 422 he was defeated by Brasidas before the town of Amphipolis, and himself slain, after which the opposite party in Athens got the upper hand, and concluded the peace with Sparta known as the Peace of Nicias (421 B.C.).

The effect of this peace was to divide the Spartans and the Corinthians, who had hitherto been allies. The latter united themselves with Argos, Elis and some of the Arcadian towns to wrest from Sparta the hegemony of the Peloponnesus. In this design they were supported by Alcibiades, a nephew of Pericles, a man of handsome figure and great personal accomplishments. The war which was now waged between Sparta and Corinth with her allies resulted, however, in favor of the former, whose arms were victorious at the battle of Mantinea in 418.

Soon after this the Athenians resumed hostilities, fitting out in 415 B.C. a magnificent army and fleet, under the command of Alcibiades, Nicias and Lamachus, for the reduction of the Dorian city of Syracuse in Sicily. This undertaking, which renewed the race hatred between Sparta and Athens, was a complete failure. Alcibiades was accused in his absence of several offenses against religion and the constitution, and deprived of his command. Thirsting for revenge, he betook himself to Sparta, and exhorted the city to renew the war with Athens. By his advice one Spartan army was despatched to Attica, where it took up such a position as prevented the Athenians from obtaining supplies from Eubœa, while another was sent under Gylippus to assist their kindred in Sicily. These steps were ruinous to Athens. Lamachus fell in the siege of Syracuse, and the Athenian fleet was totally destroyed. The reinforcements sent out under Nicias and Demosthenes were defeated (413 B.C.) by the combined Spartan and Syracusan armies. All the Athenians who escaped death were made captives and compelled to work as slaves in the quarries of Sicily, although it may be mentioned as an interesting fact that many of these captives obtained their liberty by being able to recite fragments of Euripides.

After this disaster many of the allies of Athens joined the Spartans, who now pressed on the war with greater energy. The Athenians recalled Alcibiades, who returned in 407, and was received by his fellow-citizens with enthusiasm as their expected deliverer. A few months later he was again an exile, having been deprived of the command because one of his subordinates had lost a naval battle fought off Ephesus in his absence. During the rest of the war the Athenians had only one success, the naval victory won off the islands of Arginusæ over the Spartan Callicratidas in 406. In the following year (405) the Spartans made themselves masters of the whole of the Athenian fleet except nine vessels, while the majority of the crews were on shore at Ægospotamos on the Hellespont. The Spartans now easily subdued the islands and states that still maintained their allegiance to the Athenians, and laid seige to Athens itself. In 404 B.C. the war was terminated by the Athenians' surrender. Sparta immediately imposed upon Athens an aristocratic form of government, placing the supreme power in the hands of the Thirty Tyrants. Only a year later, however, (403), Thrasybulus was able to overthrow this hated rule and reestablished the democracy.

The fall of Athens resulted in Sparta's leadership or hegemony in Greece, which lasted till the battle of Leuctra, 371 B.C. The Spartans now abused their power and speedily roused the hatred and jealousy of the other states. The Greek states which had up to this time been, and still continued to be, leaders, had now lost almost entirely their manliness and independent spirit, and no longer maintained the hereditary war against Persia, but each sought the aid of that power for its own purpose. The Spartans did indeed send an expedition into Asia Minor, but it came to nothing; and the states of Greece, the Spartans included, at last, in 387, agreed to the disgraceful Peace of Antalcidas, by which the whole of the west coast of Asia Minor was ceded to the Persians, and the Greek colonies there thus deprived of the independence that had been secured to them by the Peace of Cimon.

An act of violence committed by a Spartan general in Thebes in 380 in the end led to the complete downfall of that city. The aristocratic party in Thebes, when the Spartan army happened to be in the neighborhood, prevailed upon the general to give his assistance in overthrowing their opponents and establishing an aristocratic government. A number of the less prominent members of the defeated party, among them Pelopidas, made their escape to Athens, where they got the support and assistance of the democratic party there. They soon returned in disguise to their own city, surprised and murdered the leaders of the aristocratic party, expelled the Spartan garrison, and again set up a democratic government. These circumstances give a good idea of the fury of party strife which was then general in the Greek cities. The immediate result of this counter-revolution in Thebes was a war with Sparta, the heroes of which were Epaminondas and Pelopidas, who were then at the head of affairs in Thebes. In the course of the war the Spartans invaded Bœotia, but were so completely defeated at Leuctra in 371 B.C. that they never fully recovered from the blow.

With this victory Thebes won hegemony in Greece, which she maintained during the lifetime of Epaminondas, whose policy it was to keep down the power of Sparta by strengthening the surrounding states. From him the Messenians recovered their freedom, and by his advice the cities of Arcadia formed themselves into a confederacy, and built the city of Megalopolis. This policy was at first successful, but in a few years the confederacy began itself to strive after the supremacy, and joined themselves with this object to the Spartans. Epaminondas then invaded the Peloponnesus, but although the Thebans totally defeated the Spartans and Arcadians in the battle of Mantinea (362), yet the victory being won with the loss of their great general, the Thebans could no longer boast with justice of supremacy in Greece. Pelopidas had died two years before.

Two years after the death of Epaminondas, Philip, the father of Alexander the Great, became king of Macedonia. He was a man of great ability as a soldier and a ruler, an admirer of the Greek character, and a lover of Greek art and literature. He perceived, however, the weakness of the Greeks, arising from their want of unity, and waited for an opportunity of interfering in the affairs of their country, with the view of ultimately making himself master of it. An occasion for interference was furnished him by the Sacred War (355–46). The Phocians having taken possession of some of the land belonging to the sanctuary of Delphi, the Amphictyonic League condemned them to pay a fine and restore the land they had taken. This was refused and the league imposed upon the Thebans the task of forcing the Phocians to submit, but in their rocky strongholds the Phocians were able to resist all the efforts of their assailants, who at last called in the aid of Philip of Macedon. With his help the Phocians were subdued, they themselves expelled from the league, and their place given to Philip.

It was not, however, till the Locrian war (339–38) that Philip acquired a firm hold in Greece. The Locrians had committed the same offense as that of the Phocians, and when they likewise refused to pay the fine imposed upon them by the league, Philip, as one of the members, received the charge of punishing them. The advance of Philip was at first witnessed with comparative indifference by the states of Greece, but when his real designs became apparent the Athenians, on the advice of Demosthenes, hastily concluded an alliance with the Thebans, and an army was sent out to oppose him. The battle of Chæronea (338) turned out, however, disastrously for the Greeks, who saw their whole country laid at the feet of Philip. But the conqueror treated his new subjects with mildness, wishing to reconcile them to the Macedonian yoke, and to win their co-operation in his projected invasion of the rotten empire of Persia. He collected a large army, of which he got himself declared commander-in-chief by the Amphictyonic League in an assembly held at Corinth in 337 B.C.; before he was able to start he was assassinated 336 B.C.

The design of Philip on Persia was taken up and carried out by his son Alexander the Great, during whose absence Antipater was left behind as governor of Macedonia and Greece. Soon after the departure of Alexander, Agis III of Sparta headed a rising against Antipater. He was defeated, however, in the battle of Megalopolis in 330 B.C. and no other attempt was made by the Greeks to recover their liberty for nearly 100 years. At the close of the wars which followed the death of Alexander, and which resulted in the division of his empire, Greece remained with Macedonia.

The last efforts of the Greeks to recover their independence proceeded from the Achæans, who held the northern strip of the Peloponnesus. This tribe is frequently mentioned by Homer as taking a very prominent part in the Trojan war; but during the historical period of Greece they for the most part kept aloof from the quarrels of the other states, and did not even furnish assistance in repelling the Persian invasion. They had taken part, though reluctantly, in the Peloponnesian war on the side of Sparta, and had shared in the defeat of Megalopolis in 330 B.C. In the course of the first half of the 3d century B.C. several of the Achæan towns expelled the Macedonians, and revived an ancient confederacy, which was now known as the Achæan League. About the middle of this century the league was joined by the town of Sicyon, the native city of Aratus, who soon after became its leading spirit. Through his influence it was joined also by Corinth, and then it began to aim at acquiring the supremacy throughout the Peloponnesus, and even throughout the whole of Greece, as well as at delivering Greece from the Macedonian yoke. In following out the first of these aims Aratus and the league came into collision with Sparta, which at that time happened to be governed in near succession by two kings, Agis IV (244–240) and Cleomenes (236–220), who had both something of the old Lycurgan spirit in them. These, then, naturally looked with jealousy on the efforts of Aratus, and during the reign of Cleomenes a war broke out between Sparta and the Achæan League. The league was at first worsted, and was only finally successful when Aratus, forgetting the ultimate end of his efforts in the pursuit of that which he had more immediately in view, called in the aid of the Macedonians. In the battle of Sellasia, in 222 B.C., Cleomenes was defeated and compelled to take to flight, and the Macedonians became masters of Sparta. Aratus died in 213, and his place was taken by Philopœmen, "the last of the Greeks," who roused the league once more to vigorous efforts, and gradually succeeded in making it in some degree independent of Macedonia.

About this time the Romans, who had just come out victorious from a second war with Carthage, in which they had had to contend with Hannibal, found an occasion to interfere in the affairs of Greece. Philip V of Macedon had allied himself during this war with Hannibal, and, accordingly as soon as the war was concluded, the Romans sent over Flamininus to punish him for so doing, and in this war with Philip the Romans were joined by the Achæan League. Philip was defeated at the battle of

Cynoscephalæ in 197 B.C., and was in consequence obliged to agree to a peace, in which he recognized the independence of Greece. To gratify the Greek vanity Flamininus proclaimed the deliverance of Greece from the Macedonian yoke at a celebration of the Isthmian games in 196 B.C.; but the Greeks soon felt that they had only exchanged masters, that they were in reality, although not in name, as much in subjection to them as they had ever been to the Macedonians. On this account the Ætolians, who had formed a league similar to that of the Achæans, appealed for assistance against the Romans to Antiochus the Great, king of Syria, one of the kingdoms which had been formed out of the empire of Alexander. The appeal was listened to; but the help afforded was useless, for Antiochus was defeated in a bloody battle at Magnesia in Asia Minor in 190 B.C. The Ætolians were compelled to pay a money indemnity, and to sacrifice some of their art treasures.

By this time the Achæan League was unquestionably supreme over all other powers within Greece, having been joined by all the states of the Peloponnesus. But the league itself was in reality subject to Rome, the senate of which assumed the right of regulating its proceedings; and on one occasion, in 168 B.C., on the conclusion of a war waged by the Romans against Macedonia, the former carried off into Italy 1,000 of the noblest Achæans, on the pretext that they had furnished assistance to the Macedonians. Such was the condition of affairs until 147 B.C., when the league openly resisted a demand made by the Roman senate, that Sparta, Corinth, Argos, and other cities, should be separated from it, in consequence of which a war ensued, which was concluded in 146 B.C. by the capture of Corinth by the consul Mummius.

The independence of Greece was virtually gone with the fall of Corinth. From this date the prosperity of her cities rapidly declined, and the last sparks of the ancient Greek patriotism and love of independence became extinguished. The various cities still retained, however, something of the qualities for which they had been remarkable at the height of their glory. Athens was still one of the centres of culture, and the cradle of all kinds of new speculations. Many Athenians left their native city and made a livelihood, although they gained little esteem, among the Romans, as artists and scholars, actors and dancers, poets and wits. The citizens of Sparta continued to gratify their thirst for warfare as well as their covetousness by serving as mercenaries in foreign armies. Corinth was still the home of luxury and vice.

From the date above mentioned Greece remained attached to the Roman empire. On the division of the Roman empire it fell of course to the eastern or Byzantine half. From 1204 to 1261 it formed a part of the Latin Empire of the East, and was divided into a number of feudal principalities. In the latter year it was reannexed to the Byzantine empire (q.v.) with which it remained till it was conquered by the Turks between 1460 and 1473. In 1699 the Morea was ceded to the Venetians, but was recovered by the Turks in 1715. (For the history of the present kingdom of Greece, see GREECE, MODERN).

Cosmogony.— Nowhere did polytheism develop itself into a brighter and more beautiful system than among the ancient Greeks. It was this circumstance no doubt that led the Romans, when they became acquainted with the literature and religion of the Greeks, to blend the Greek system with that of the ancient Italians, identifying the Greek deities with those of their own pantheon. In this way the Greek and Italian deities came to be confounded.

According to the view of the origin of all things which in course of time grew up among the Greeks, the universe was in the beginning a formless mass, Chaos (confusion), from which arose the "broad-bosomed" Earth (Greek, *Gaia, Gē;* Latin, *Tellus*), the Lower World (Tartarus), the darkness of Night (Greek, *Nux;* Latin, *Nox*), the parent of Light, and the formative principle of Love (Greek, *Erōs;* Latin, *Amor*), all of which were regarded as independent divinities. From the womb of the Earth proceeded the Heaven (Greek *Ouranos;* Latin, *Cœlum*) and the Ocean, and afterward the Titans, creatures of superhuman size and strength, who formed the first dynasty of gods. The Titans were succeeded by a more genial race of divinities endowed with intellectual as well as physical qualities, who subdued the Titans, and subsequently the Giants, another race whom the Earth produced after the loss of her first brood. In this second dynasty of gods the supreme ruler was Zeus (Jupiter or Juppiter), the son of Kronos (Saturn), who after the subjugation of the Titans and Giants ruled in Olympus over "the middle air," while his brother Pluto reigned over the dark kingdom of the lower world (Hades, Tartarus, Orcus), and Poseidōn (Neptune), armed with his trident, ruled in the sea. Like reverence was paid to Hēra (Juno), the sister and wife of Zeus, and the queen of Heaven, the virgin Pallas Athēnē (Minerva), a goddess armed with helmet and shield, and worshipped as the patroness of all intellectual employments and useful inventions, to the two children of Lētō (Latona), Apollo, the leader of the Muses (hence called Musagētēs) and the protector of the fine arts, and his sister, the chaste huntress Artemis (Diana), the goddess of the moon, to the daughter of Zeus, Aphroditē (Venus), the goddess of love, Ares (Mars), the god of war, Hermēs (Mercury), the herald of the gods, and others besides. In addition to these there was an innumerable host of inferior deities (Nymphs, Nereids, Tritons, Horai, Sirens, Dryads and Hamadryads, etc.), who presided over woods and mountains, fields and meadows, rivers and lakes, the seasons, etc. There was also a race of heroes or demigods (Heracles or Hercules, Perseus, etc.) tracing their origin from Zeus, and forming a connecting link between gods and men, while on the other hand the Satyrs formed a connecting link between the race of men and the lower animals. According to a plausible theory, now less generally held than formerly, these gods and demigods are nothing else than the personified objects of nature (the Sky or Upper Air, the Sun, the Ocean, the Air in Motion, etc.), and were originally not conceived as personified, in the strict sense of the term, that is, as clothed in a human form, but simply as the objects themselves, to which the earliest races everywhere attributed a conscious existence like their own, and that the mythological tales relating to these deities and heroes were in their simplest form the natural expression of what human beings in their infancy believed to be done and felt by the very things which they saw. Such is the theory of Max Müller, Mr. Cox, and others.

With regard to the inculcation of religious beliefs and the practice of religious duties among the Greeks, the most striking thing to remember is that they had no separate class appointed to perform these functions. The priests were in no sense preachers of doctrines, but merely hierophants or exhibitors of sacred things, of rites, symbols and images. They showed how the gods were to be worshipped, or more usually how a particular god was to be worshipped; but it was not their office to teach theological doctrine. See GREEK RELIGION; GREEK GODS; GREEK MYTHOLOGY.

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GREECE, Modern (Greek *Hellas*), a kingdom in the southeast of Europe, bounded on the north by Bulgaria, Serbia and Albania, and on all other sides by the sea — the Ionian Sea on the west, the Mediterranean proper on the south, and the Ægean Sea on the east. The mainland forms two chief portions, united by the narrow Isthmus of Corinth; a northern, called Northern Greece or Livadia, and a southern peninsula, called the Peloponnesus or Morea. By far the largest of the immediately adjacent islands is Eubœa, only separated from the mainland of Livadia by the narrow channel of Euripo. The other islands form several groups: The northern Sporades on the northeast of Eubœa including Skiathos, Skopelos, Khiliodromia, Pelagonisi, Sarakinon or Peristeri, and Skyros; the western Sporades, chiefly in the Gulf of Egina, or between it and the Gulf of Nauplia, including Hydra, Spetsæ, Poros, Egina, and Salamis or Koluri; the Cyclades; the Ionian Islands, and the great island of Crete, the annexation of which by Greece was recognized by the Powers at the close of 1913. The capital and largest town is Athens.

Physical Features.— See GREECE, ANCIENT.

Divisions, Area and Population.— The acquisition of new territories by Greece, obtained as the result of the war with Turkey from 17 Oct. 1912 to 30 May 1913, and with Bulgaria from 30 June to 10 Aug. 1913, have given the country a total area of 41,933 square miles with an estimated total population (1914) of 4,821,300. The new territory is 16,919 square miles in extent. The Powers, in accordance with the treaties of London and of Athens, have decided that Greece shall retain all those Ægean islands which she occupied during the war, and Greece is in occupation of all the islands. In November 1914, Greece, with the consent of the Great Powers, occupied North Epirus (see ALBANIA) and, in March 1916, formally took possession of the district. Pop. about 250,000. The names or departments into which Greece is divided, with their populations, are as follows:

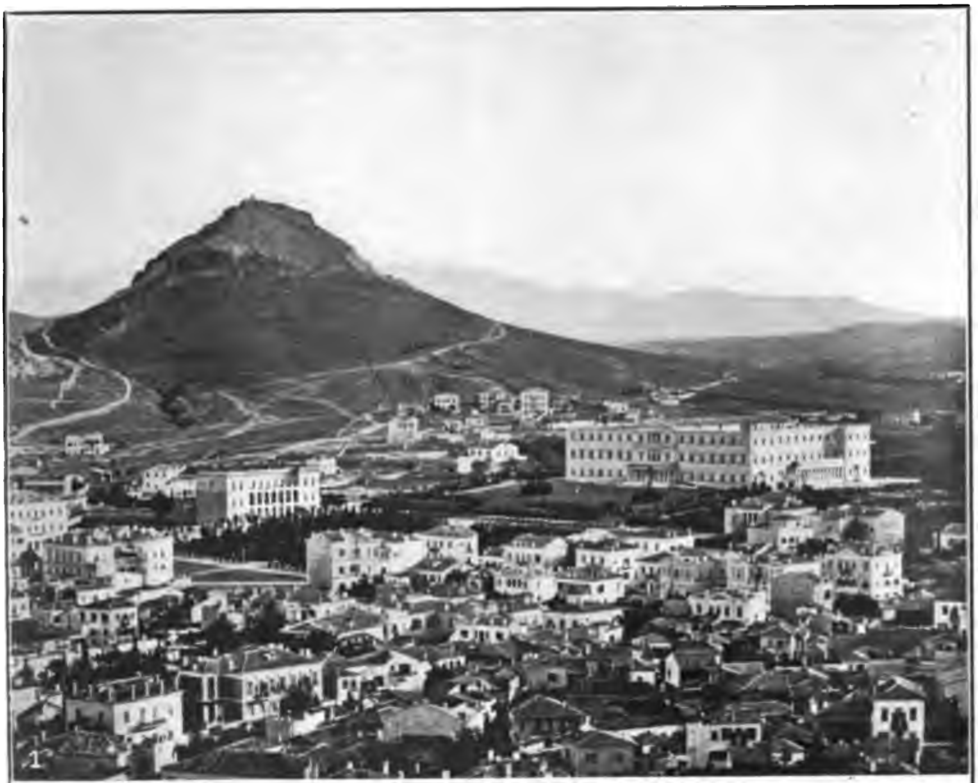
DEPARTMENTS.

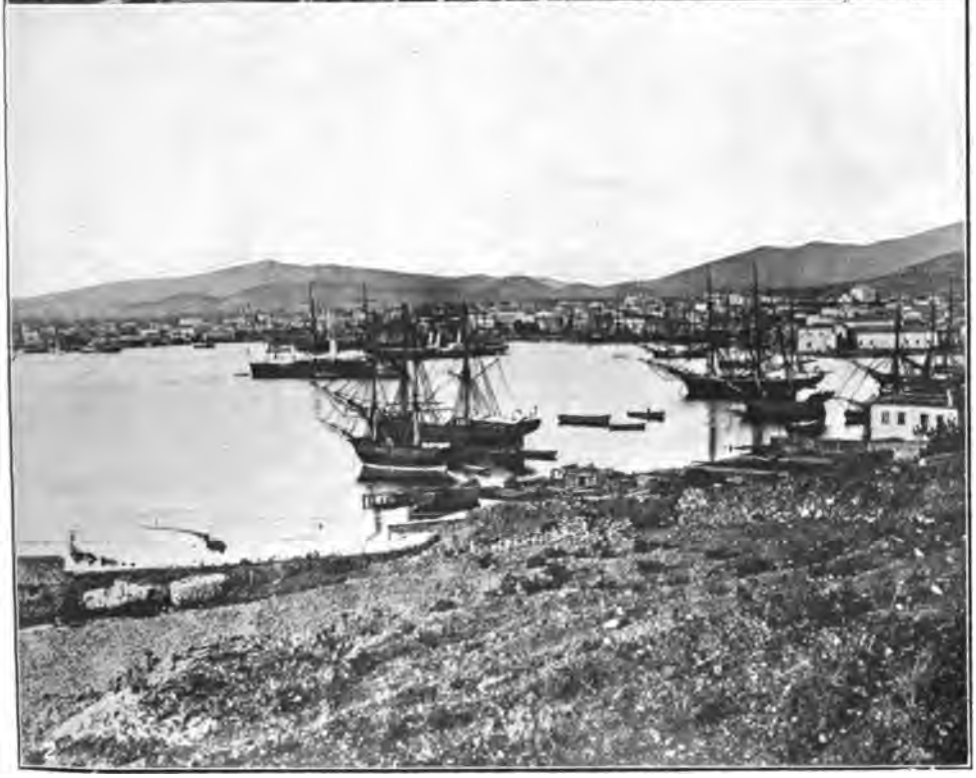
(Old territory)	Population
Attica and Bœotia	407,063
Phthiotis and Phocis	174,574
Acarnania and Ætolia	188,597
Achaia and Elis	254,728
Argolis and Corinthia	153,172
Arcadia	162,324
Laconia	148,628
Messenia	218,514
Eubœa	116,903
Cyclades	130,378
Corfu	140,757
Cephalonia	71,235
Zante	42,502
Larissa	197,808
Trikkola	183,489
Arta	52,441
(New territory)	
Macedonia:	
Salonica	503,896
Serres	132,841
Drama	174,091
Kosani	206,287
Florina	133,003
Epirus:	
Janina	245,618
Ægean Islands:	
Mytilene	182,167
Chios	73,830
Samos	68,949
Canea	77,159
Heraclion (Candia)	110,016
Stakia	25,027
Lasithion	62,611
Rethymnon	61,339
Total (old territory)	2,643,109
Total (new territory)	2,056,832
Total	4,699,941

Climate.— Generally speaking the climate resembles that of the other Mediterranean countries. The elevated portions, however, do not enjoy the subtropical climate of the rest of the country. There are great extremes of heat and cold. The sirocco blasts from Africa render part of the summer far from enjoyable and in winter the cold north winds are equally disagreeable. The lowlands have little snow or frost but in the mountain regions there is much snow, the first falling in October and the last in April. In the western and mountainous section there is considerable rainfall, but in the eastern section excessive droughts prevail, all the minor streams become dried up, and irrigation is necessary for the growth of farm crops. The autumn and winter rains are often excessive, often causing the streams to overflow their channels and laying considerable tracts under water. In this way stagnant pools and marshes are occasionally formed, which give rise to intermittent fevers. Compare GREECE, ANCIENT, *Climate*.

Vegetation, Agriculture, etc.— The cultivated land in Greece has recently been estimated at rather more than 5,563,100 acres. There are besides 5,000,000 acres of pasture land, and 3,000,000 acres of waste land. The draining of

GREECE





1 Modern Athens

2 The Piræus, Athens

Lake Copais redeems 60,000 acres of land, which the company divides into holdings of from 5 to 50 acres. English agricultural machinery is being introduced, but still agriculture is in a backward state.

Thessaly is the richest portion of Greece agriculturally. The condition of the agricultural population is said to be very satisfactory. The principal cereal crops are wheat, barley and maize, but the quantity raised is not sufficient, and much grain is imported. All the fruits of the latitude are grown — figs, almonds, oranges, citrons, melons, etc. — in abundance and of excellent quality, without receiving any great share of attention. The vine also grows vigorously, and considerable quantities of wine are made, some of the sorts being of high quality. But a much more important product of Greece, especially on the coasts of the Peloponnesus, and in the islands of Cephalonia, Zante, Ithaca and Santa Maura, is the Corinthian grape or currant, the export of which increased in value from $8,238,118 in 1900 to $8,910,000 in 1908; in 1914 the value was $7,939,855. Another important object of cultivation is the olive, for which both the soil and the climate are alike favorable. The culture of the mulberry for the rearing of silk-worms is carried on to some extent. Some good tobacco is grown. The forests contain, among other trees, the oak (*Quercus Ægilops*) which yields the valonia of commerce. The breed of cattle is being improved, and irrigation canals are being constructed. Asses and mules are more numerous than horses; cattle are still comparatively few; and the chief animals from which dairy produce is obtained are the sheep and the goat. The quantity of wool produced is considerable, but most of it is of a coarse description.

Manufactures, Trade, Communications, etc.— The manufactures are limited, but with all other branches of industry in Greece are increasing, and are furthered by high duties on imported goods. The employment of the steam-engine in manufacturing industries dates from about 1868, and is yet only developed to a small extent. Piræus is the chief industrial centre, having spinning and weaving factories for cotton, silk and wool, machine-shops, paper-works, dye-works, etc. Other centres are Syra, Corinth, Nauplia, Patras, Larissa. Still, cottons and other textiles form by far the most important part of the imports of manufactured goods. Leather manufactures form an important branch of industry. Marble has been worked from the most ancient period in the quarries of the island of Paros. In 1871 the working of the ancient argentiferous lead mines of Laurion in Attica was resumed with good success; and quantities of manganese iron ore and zinc ore are also mined in this district. Ship-building is carried on at various places. A large part of the foreign shipping of Greece is that which deals with the import of the manufactures of England, Germany, etc., into Greece, Turkey and the Levant generally. In regard to this branch, the peculiar advantages which the Greeks possess in their knowledge of the languages, and acquaintance with the habits and wants of the people of these countries, have been greatly in their favor. The chief ports of Greece are Piræus (population 73,579, the port of Athens), Syra and Patras (population 37,958). The principal articles of export are currants (very largely to Britain), wine, olive-oil, dried figs, raisins, silver, lead, zinc ore and manganese iron ore, tobacco, sponges; the principal imports are cereals, coal and cotton and woolen goods. The imports in 1901 were $27,773,010; in 1914, the imports were $35,026,905; the exports, $23,425,375. The greatest hindrance to the development of Greece is the want of good roads, which are peculiarly necessary in so mountainous a country. Attention, however, has been directed to the supplying of this want, and there are now over 3,000 miles of roads. Among other public works which have engaged the energies of the Greeks are the construction and restoration of harbors, the erection of lighthouses, the execution of drainage works, etc. In 1883 there were only 58 miles of railways open, but in 1914 about 1,365 miles were open, and 100 were under construction. A ship canal across the isthmus of Corinth (four miles) was opened in 1893.

Weights, Measures and Money.— The French metric system of weights and measures has been introduced into Greece by the government, but the people still adhere to the old system. In the latter the standard lineal measure was the *pikē,* equal to three-quarters of an English yard; the standard square measure was the *stremma,* nearly equal to .242 of an English acre; the standard weight was the *oke* = 2.80 pounds avoirdupois: 44 *okes* were equal to 1 cantar, or about 124 pounds avoirdupois. The weights and measures of the metric system are called royal, to distinguish them from the old weights and measures. In this system the French measures of length, millimetre, centimetre, decimetre and metre are called respectively *gramma, daktylos, palamē* and *pēcheus* (cubit). The kilometre is called a *stadion,* and the myriametre *skoinis.* The new or royal measures of surface are the square *pēcheus* = the square metre, and the *stremma* = the *are.* The measures of capacity are the *kybos, mystron, kotylē, litra,* and *koilon,* respectively equal to the millilitre, centilitre, decilitre, litre and hectolitre. The weights for gold, silver and precious stones are the *kokkos, obolos* and *drachma,* respectively equal to the centigramme, decigramme and gramme. The commercial unit of weight is the *mina* = 1,500 *drachmas* = 1½ kilogramme. The *talanton* is equal to the quintal and the *tonos* equal to the tonneau.

In 1875 Greece entered the monetary league of which the other members are France, Italy, Switzerland and Belgium, and all the members of which have a monetary unit equal to the franc in value. The name of the Greek unit is the *drachma,* divided into 100 *lepta,* nominally equal to a franc but varying considerably in value.

Government, Revenue, Debt, and People. — As settled by the present constitution the throne is hereditary according to the law of primogeniture in the family of King George. The king must be a member of the Greek Orthodox Church. He attains his majority at the age of 18. The legislative authority is vested in a single chamber, called the Boulē, the members of which (proportioned in number to the amount of the population) are elected for four years by ballot by manhood suffrage. It meets every year on 1 November, unless called at an earlier date for special business. The executive power is exercised by the king through a responsible ministry. The Greek Orthodox Church alone is established, but all other forms of religion enjoy toleration. The highest ecclesiastical authority, subject to the king, is vested in a permanent synod, which sits at Athens, and consists of five members appointed by the king from the highest dignitaries of the Church. There is one metropolitan, who has his seat at Athens; and about 80 archbishops and bishops, are presented and ordained by the synod and confirmed and invested by the king. Justice is administered, on the basis of the French civil code, by a supreme court (*Areios Pagos*), which has its seat at Athens; five higher courts, one at Athens, one at Nauplia, one at Patras, one at Larissa, and one at Corfu; and a number of courts of primary resort (*Protodokeia*), in the principal towns. The public revenue, derived chiefly from direct taxes, customs, stamps, excise, monopolies, the rent of national property, etc., was estimated for 1910 at $26,251,204, and the expenditure at $27,277,152. Estimates of revenue and expenditure for 1915 (including all the new territories), $82,290,670 for the former and $139,703,970 for the latter. Greece has a very large public debt. In January 1916 the outstanding external debt amounted to $231,445,500, besides loans amounting to $21,144,000. A considerable portion of the debt incurred in recent years has been in the way of raising loans for the making of railways. Of the foreign debt one loan is guaranteed by Great Britain, France and Russia, which have latterly had to pay the dividends on it. The payment of the interest on its public debt has long been with Greece a matter of difficulty. Every male Greek on attaining the age of 21 years is liable to military service, his term being two years with the colors, 10 with the reserve, eight in the national guard and 10 in the national guard reserve. The army in 1910 numbered about 23,000 on a peace footing, and the peace establishment for 1915 was about 60,000. The navy in 1915 had two vessels of 13,000 tons each, one of 10,118, three of 5,000, one of 2,600 tons, 14 destroyers, six modern torpedo boats, two submarines, etc. The population contains a considerable intermixture of foreign stocks, among which the Albanese, or Arnauts, are the most numerous; but the great majority, though not without some taint in their blood, are of genuine Greek extraction, and, both in physical and mental features, bear a marked resemblance to their celebrated forefathers. It is true that the degrading bondage to which they were subjected for centuries has sunk them far below their natural level, and too often substituted sycophancy and low cunning for the intellectual superiority which, in earlier and better times, displayed itself in immortal productions of the chisel and the pen; but that the original elements of greatness still exist has been proved by the noble struggles which they have made for independency.

Education.— The educational system of Greece, organized in 1834 by George Gennadius, one of the leaders of the war of independence, is very complete. There are three grades of schools, the demotic or primary national schools, the Hellenic or secondary grammar schools, and the gymnasia, in which, it is asserted, the range and the level of the teaching are much the same as in a German gymnasium or in the upper parts of our public schools. In all three grades of schools education is gratuitous, and in the primary schools it is compulsory on all children between 5 and 12. There is a university at Athens, attended by nearly 3,000 students, many of whom come from districts under the rule of the Sultan. Thus far, however, education seems to be actually diffused among the people only to a limited extent, though the numbers that receive a university education are so great that many such young men find themselves without any proper sphere of employment and are obliged to adopt the career of politician and place-hunter. Many of these are now, however, said to be finding better ways of turning their education to account through the rapid development of trade and industry. The national dress of the Greeks resembles the Albanian costume. For the men it consists of a tight jacket, generally scarlet, a white linen kilt in numerous folds, a bright-colored sash round the waist and embroidered gaiters; for the women it consists of a vest or jacket fitting close to the shape and a skirt, on the head a kind of fez or skull-cap.

History.— From the year 1715 (see preceding article) till 1821 the Greeks were subject to the domination of the Turks. In 1770, and again in 1790, they made attempts at insurrection, which, however, were speedily frustrated. In the early years of the 19th century a secret society was formed for the purpose of effecting their liberation from the galling yoke, and in 1821 they found an opportunity of breaking out into another insurrection, which in the end proved successful. In that year Ali, the pasha of Janina, revolted against the Sultan Mahmoud II and secured the aid of the Greeks by promising them their independence. The rising of the Greeks took place on 6 March, under Alexander Ypsilanti, and on 1 Jan. 1822 they published a declaration of independence. In the same year Ali was assassinated by the Turks, but the Greeks nevertheless continued the struggle that they had begun and in which they were encouraged by the sympathy of nearly all the nations of Europe. Among the most distinguished of their leaders were Marcos Bozzaris, Capo d'Istria, Constantine Kanaris, Kolocotroni, Miaulis, Mavrocordato, Mavromichaelis, etc. In 1823 they were joined by Lord Byron, who, during the last year of his life, did all in his power to further their cause by his wealth, as well as by his active efforts on their behalf. Unfortunately he died in April of the following year. In 1825, the Turks having called to their aid Mehemet-Ali, the pasha of Egypt, the latter sent his son, Ibrahim Pasha, whose talents secured them the success that they had hitherto been unable to attain. Tripolitza, the capital of the Morea, was taken, as was also Missolonghi, in spite of the valor of the Suliote mountaineers. It was about this time that the Greek patriots received the aid of the English admiral, Lord Cochrane, who organized their fleet, and of French officers who instructed their army in the system of European tactics. In spite of this, however, the Turks continued to triumph everywhere and resisted all the pressure that was put upon them by other European powers to make concessions. A treaty was then concluded at London (6 July 1827) between Britain, France and Russia for the pacification of Greece, and when the mediation of these three powers was declined by the Sultan, their united fleets, under Admiral Codrington, attacked and annihilated the Turkish fleet off Navarino, 20 Oct. 1827. In the beginning of the following year (1828) Count Capo d'Istria became president of the state, and later in the same year Ibrahim Pasha was forced to evacuate Greece. At last, on 3 Feb. 1830, a protocol of the allied powers declared the independence of Greece, which was recognized by the Porte on 25 April of that year. The new member of the states of Europe received from the allies a monarchical form of government and offered the crown to Leopold, Prince of Saxe-Coburg, and when he refused it, to Otho, a young prince of Bavaria. The latter accepted the offer and was proclaimed king of the Hellenes at Nauplia, on 30 Aug. 1832. The power of the king was at first almost absolute and his arbitrary measures, and more especially the preponderance which he gave to Germans in the government, soon made him unpopular. At the same time the finances of the kingdom were in a very embarrassed condition and a general uneasiness prevailed. In 1843 a rebellion took place, after which a constitution was drawn up. But Otho was after that no more popular than before, and after the outbreak of another rebellion in February 1862, he saw himself compelled to abdicate the throne (24 October). A provisional government was then set up at Athens and the National Assembly after declaring that the throne had been forfeited by Otho, offered it in succession to Prince Alfred, of England, and Prince William George, of Denmark. The latter accepted it and 30 March 1863 was proclaimed as King George I. At the end of that year a constituent assembly was elected for the purpose of framing a new constitution, and the result of its labors was the constitution which is still in force. In 1864 an addition was made to the small kingdom by the annexation of the Ionian Islands, which had hitherto formed an independent republic under the protection of Britain. From the first Greece had been watching for an opportunity of extending its frontier northward, so as to include the large Greek population in Thessaly and Epirus. In 1878 the Congress of Berlin recommended that the northern boundary of the kingdom be readjusted. Turkey refused to make any concessions and negotiations were protracted until in 1881 the Powers accepted the terms offered by Turkey, by which Greece received all Thessaly south of the northern watershed of the Salambria, together with Larissa and Trikkala and in Epirus the Arta River was made the boundary, Arta being left to Greece. The Greeks accepted this settlement as the best to be obtained at the time, but began to agitate for the union of Crete, which they regarded as Greek territory. In 1896 a conflict broke out in Crete between the Christians and Mohammedans and Greece made an attempt to annex the island. The Powers interfered, compelling Greece to withdraw and decreeing the autonomy of the island. A war element in Greece now embroiled Greece in a war with Turkey, for which the former was wholly unprepared, and hostilities began in April 1897. Within 31 days the Turks had put the whole Greek army to flight and threatened an invasion of central Greece. This move was blocked by Russia, who peremptorily demanded an armistice, which was concluded on 18 May. A treaty of peace was concluded at Constantinople on 4 December, by the terms of which Greece was required to pay an indemnity of $18,000,000 to Turkey, the payment to be supervised by a commission of the mediating Powers, which also engaged to rectify the frontier. In 1898 Turkey was compelled by the Powers to withdraw her forces from Crete and Prince George of Greece was appointed governor of the island. The disputes between the Christians and Mohammedans rendered his administration the reverse of tranquil and he resigned in 1906, when the Powers left the power of appointing his successor to King George of Greece. M. Zaimor was appointed High Commissioner and Greek officers took command of the Cretan army. When the Young Turks overthrew Abdul Hamid in 1908 the Cretan Assembly declared the union of the island with Greece, but the Powers refused to sanction any violation of the agreement of 1898. When the Balkan War broke out Cretan delegates were admitted to the Greek Parliament and in 1913 Crete was ceded to Greece by the Treaty of London. Greece had meanwhile become embroiled with her neighbors to the north in connection with Macedonia, and there was bitter feeling between Greece and Rumania and Bulgaria until 1912. Turkey had now become greatly weakened through civil strife and Greece joined in the coalition against her with Bulgaria, Serbia and Montenegro. The Greek army captured Saloniki and overran southern Macedonia, and her navy captured several Turkish islands in the Ægean, while hindering greatly the movement of Turkish troops from Asia Minor. King George was assassinated 18 March 1913 while on a tour of inspection in Saloniki and was succeeded by Crown Prince Constantine. The division of the spoils led to a war between the allies (see BALKAN WAR) and several atrocities were laid to the Greeks. By the Bucharest Conference Greece received all of Thessaly and the best parts of Macedonia and Thrace, together with part of Epirus. Crete also was given her and the islands of the Ægean not occupied by Italy. Thus Greece in great part realized her dream of a Greater Greece. At the outbreak of the great conflict in Europe in 1914 Greece proclaimed a policy of strict neutrality. For subsequent events involving the position of Greece in regard to the world conflict and leading to the abdication of King Constantine see WAR, EUROPEAN.

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Author of 'The Great God Pan,' etc.

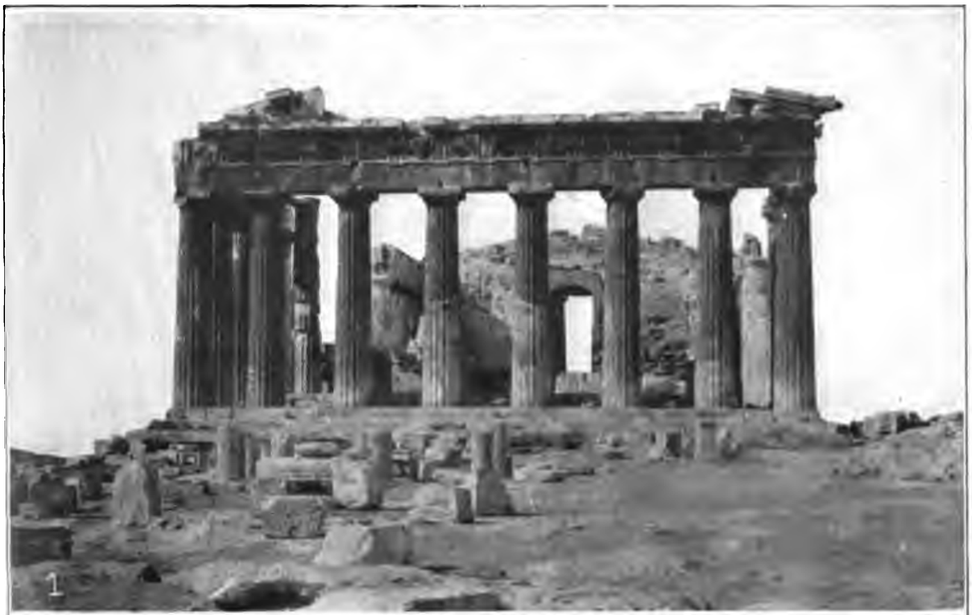
GREEK ANTHOLOGY, The. An anthology is a «collection of flowers.» 'The Greek Anthology,' often referred to as the Palatine

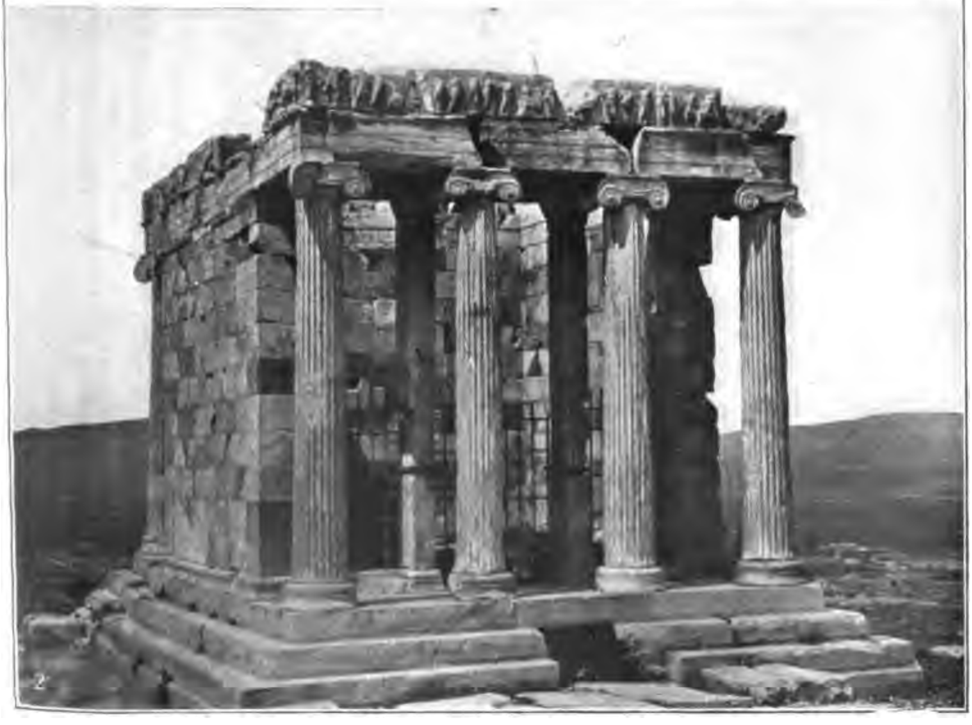
Anthology, is a collection of epigrams and epigrammatic poems, very few of which exceed 12 lines, and more than nine-tenths of which are written in the alternation of hexameter and pentameter known as the elegiac metre. They number about 4,100, represent a period of some 1,700 years, and comprise a variety of subject matter as wide as life itself. Their perfection of form and their exceedingly human content have made them a favorite field for the translator, the lover of poetry and the critic of life. Erasmus, Sir Thomas More, Hugo Grotius, Thomas Gray, Dr. Johnson, Cowper, Chénier, Sainte-Beuve, Byron and Longfellow are a few among those who have found them especially attractive. The Greek Anthology is a growth, the result of selection, contribution and arrangement by a number of successive hands. (1) Meleager, a Syrian of the early 1st century before Christ, made the first collection of importance in his ‘Wreath,’ or ‘Garland.’ Besides poems of his own numbering about a hundred, the ‘Garland’ contained epigrams by 47 other poets, 33 of whom belonged to the period of literary cleverness and artificiality (300–146 B.C.) called Alexandrian from the principal seat of learned and literary endeavor during the time. It was Meleager's identification, in the Proem of his collection, of the verses of various poets with various flowers ("lilies" of Anyte, "roses" of Sappho, etc.) that gave the name ‘Garland’ its appropriateness, and suggested the later term Anthology. (2) Philippus of Thessalonica, more than a century afterward, made a compilation of the epigrammatic poets since Meleager. (3) Strato of Sardis collected some hundreds of amatory epigrams, including many by himself. (4) Agathias, a poet and historian at Constantinople in the time of Justinian (527–565), collected seven books of hitherto unpublished recent and contemporary epigrams, among which were his own. The method of classification according to subject — humorous, amatory, convivial, etc. — adopted by him perhaps for the first time, has usually been followed since. (5) Constantinus Cephalas, probably of Constantinople about 950, compiled a still more extensive collection, based upon and presumably incorporating principally those of Meleager and Agathias, and representing 320 poets. He broke up the Garland of Meleager, according to a commentator, and "distributed it under different heads, viz., the amatory, dedicatory, sepulchral, and illustrative pieces separately, as they are now arranged below in this book." (6) Maximus Planudes, monk, theologian, grammarian and rhetorician of the early 14th century, ambassador from Constantinople to Venice in 1327, included in a new collection of seven books 397 epigrams not in Cephalas, but also made many damaging alterations and omissions. Having superseded and caused to disappear the anthology of Cephalas, for 112 years from its first printing in Florence in 1484 the collection of Planudes remained the only anthology known. In 1606, however, the discovery by Salmasius of the famous Palatine Manuscript of Cephalas (so called from its location in the Palatine Library at Heidelberg) restored the better collection, which, with the 397 additional epigrams from the Planudean collection, has formed the material for all subsequent editions. Extracts by Salmasius and others gave place in 1776 to Brunck's ‘Analecta,’ which in 1794–1813 were superseded by Jacobs' complete edition, including also 400 epigrams found in Greek literature at large but not in the Anthology, and raising the total to about 4,500. To these might properly be added, if it were desired to make a complete assemblage of this literary form, some 2,000 actual inscriptions of varying artistic value, making a body of epigrammatical literature of about 6,500 specimens.

The best opportunity for acquaintance with the field of epigram is afforded by Mackail, ‘Select Epigrams from the Greek Anthology,’ text, translation, introduction and notes (London 1906); translation alone (ib., 1908). The ‘Loeb Classical Library’ (New York 1917) has issued two of five volumes of the complete text and translation by W. R. Paton. Graham R. Tomson's Selections from the Greek Anthology contains verse translations by Richard Garnett, Andrew Lang, Goldwin Smith, and others (London).

A number of noteworthy qualities may be enumerated as accounting for the interest of the Anthology. In the first place, it is a remarkable example of continuity and homogeneity in the attitude of a race toward the problem of life. Covering a period which begins 700 years before Christ and extends 1,000 years into the modern era, its 4,100 miniature poems, together with the 2,400 of kindred character found outside its limits, "draw for us in little," as Mackail says, "a picture of the Greek ideal with all its virtues and all its failings: it may be taken as an epitome, slightly sketched with a facile hand, of the book of Greek life." This may be said with full consciousness of the differences between the Byzantine Greek and the pagan Greek of the Golden Age. In the second place, the Anthology is an even more remarkable example of the persistence of an ideal of language and form. Throughout the 1,700 years it exhibits the same classical purity of diction, the same overwhelming preference for the elegiac vehicle, and the same epigrammatic qualities. When Planudes was making his collection, Dante had already written, and Petrarch, the Renaissance, and New Europe were at hand. Even allowing that many of the later epigrams were the product of the clever artificiality of men who, like the Renaissance Italian and the modern Greek, took pride in the demonstration by this means of their kinship with a great past, the Anthology is still a unique example of vitality in literary form. Again, the Anthology represents not only the persistence, but the perfection, of a literary species. The epigram, originally an actual inscription as its name implies, had by the time of Meleager long been literary also. The great majority of the epigrams in the Anthology are merely literary, were never inscribed on monuments and retained the right to the name by reason of their greater or lesser conformity with the inscriptional ideal. At their worst, they are forced, shallow, artificial and insincere, though rarely lacking in the virtue of form. Taken as a body, they are not to be ranked with the great examples of Greek literature. "If we might compare the study of Greek literature to a journey in some splendid mountain region," writes John Addington Symonds, "then we might say with propriety that from the spark-

GREECE

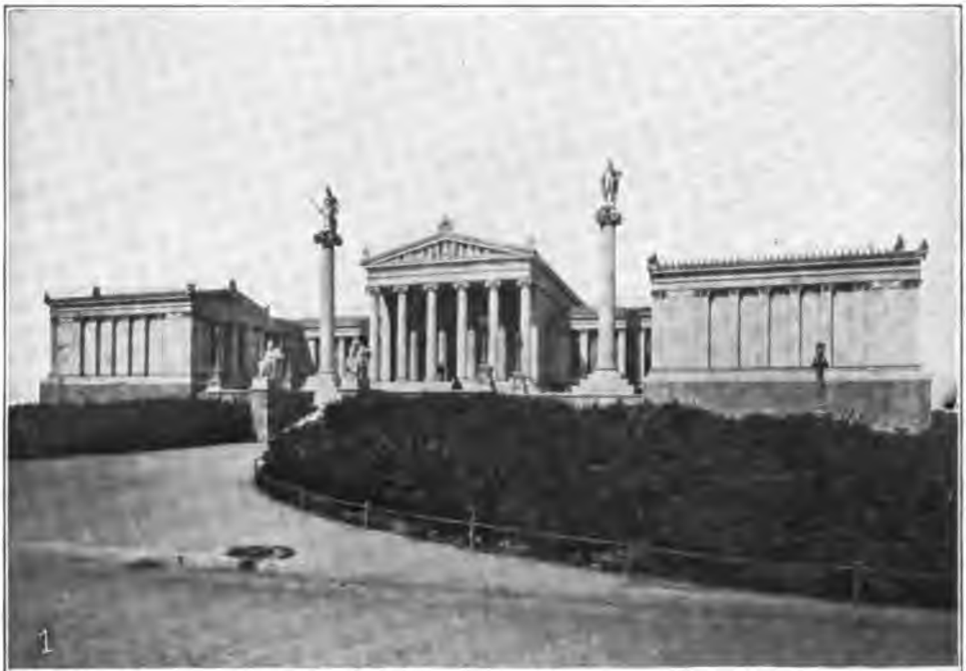


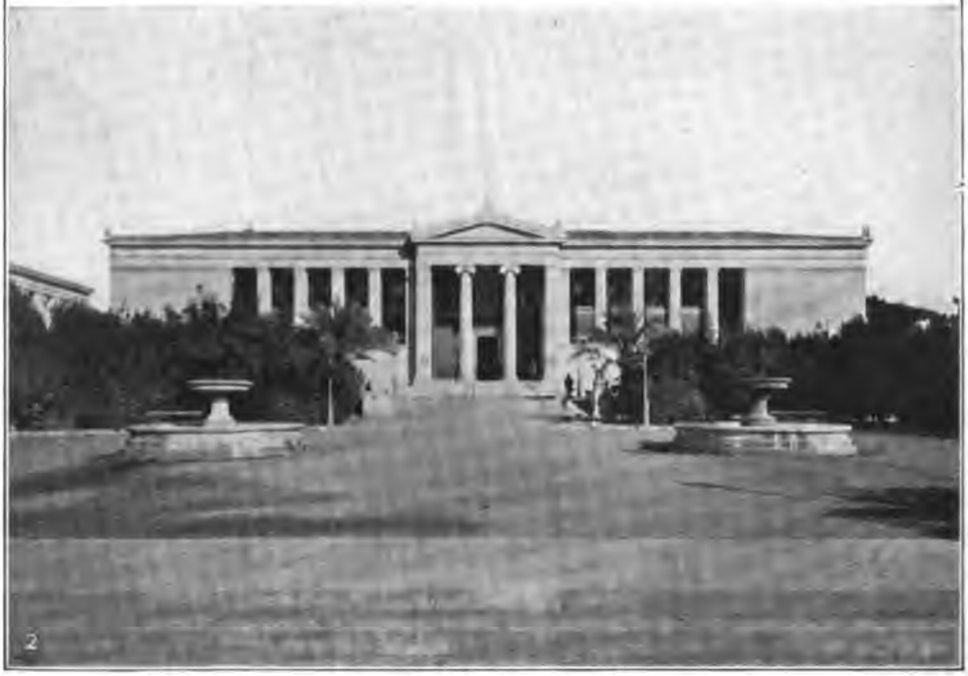


1 **Parthenon, on the Acropolis, Athens**

2 **Temple of Victory, on the Acropolis, Athens**

GREECE





1 The Academy at Athens

2 The University at Athens

ling summits where Aeschylus and Sophocles and Pindar sit enthroned we turn in our less strenuous moods to gather the meadow flowers of Meleager, Palladas, Callimachus.» At their best, however, they do not suffer from proximity to the great. They arouse unbounded admiration as possessing, in the phrase of Mackail, «just that high note, that imaginative touch, which gives them at once the gravity of an inscription and the quality of a poem»; and as realizing the ideal defined by the same critic as follows: «In brief, then, the epigram in its first intention may be described as a very short poem summing up as though in a memorial inscription what it is desired to make permanently memorable in a single action or situation. It must have the compression and conciseness of a real inscription, and in proportion to the smallness of its bulk must be highly finished, evenly balanced, simple and lucid. In literature it holds something of the same place as is held in art by an engraved gem.» Those who are not sensitive to precise, clean cut, chiselled language, neat phrasing, compression, simplicity, directness, harmonious versification — in a word, those who do not feel the glow of admiration at the beauties of conscious literary art, and even at skilful literary craftsmanship when it does not rise to heights of inspiration — will not enjoy the Anthology as it may be enjoyed.

Yet there is a final quality which brings the Anthology within the range even of readers unacquainted with the Greek tongue and not especially sensitive to form. This is its humanity. In this as in other respects, the Anthology is to be regarded as a single document rather than as the work of hundreds of hands. The epigram, more than any other species of Greek literature, tends in the reader's mind to be impersonal. It is not of the views of the poets Theocritus, Meleager, Asclepiades, Leonidas, or of the poetesses Erinna, Anyte and Nossis — the most famed of the contributors to the Anthology — that we think as we read, but of the Greek view; and into an appreciation of the teeming details in Greek life that went into the making of the Greek view — of the innumerable ordinary and extraordinary sights, sounds, thoughts and emotions experienced in Greek existence as a whole — we can hardly enter so well by any other gate as by the Anthology. In it «we possess,» as Symonds says, «an everlasting treasury of sweet thoughts. . . . The slight effusions of the minor poets are even nearer to our hearts than the masterpieces of the noblest Greek literature. They treat with a touching limpidity and sweetness of the joys and fears and hopes and sorrows that are common to all humanity.»

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GREEK ARCHITECTURE. In the compass of a brief article it will be necessary to confine our discussion of Greek architecture almost entirely to that of the classic or pre-Christian ages. For that of the Christian Greek Empire consult the title Byzantine Architecture. We divide our subject into three periods: I, All that preceded the First Olympiad (to 776 B.C.); II, from 776 to 400 B.C.; III, from 400 B.C. to 200 A.D.

I. First or Ægean Period.— The monuments of this period are found chiefly in Crete, Mycenæ, Tiryns and Troy, in Eubœa and at Orchomenos in Bœotia, and belong to the pre-Homeric and Homeric age, to a culture which was widely spread over the Ægean islands and shores, from 2000 B.C. to the Dorian migration of about 1100 B.C. The great palace of Minos at Cnossus in Crete, beehive-shaped tombs in Argolis, especially the «Tholos of Atreus» or Tomb of Agamemnon at Mycenæ, the palaces and fortifications of Tiryns, Mycenæ and Troy, and other like remains, reveal a somewhat primitive type of architecture, employing at times enormous stones, but also rubble, wood and crude brick, with occasional details of alabaster, bronze or terra-cotta and even glass. No remains of temples have been identified. Columns were used tapering downward, as in the Tholos Gate at Mycenæ; roofs were of wood or stone, and the arch was unknown. This art, first made known by the researches of Schliemann, Dörpfeld and Evans, declined and disappeared with the advent of the Dorians about 1100 B.C.

II. Great or Periclean Age.—After 776 B.C. an entirely new architecture appears, the Doric, whose birthplace and origins are still uncertain. The earliest recorded temple, that of Hera at Argos, seems to have been of wood; the next oldest, also of Hera, at Olympia, may have been built as early as 1000 B.C., but no part of its present remains can be dated so far back. At Selinus and at Corinth are ruins of temples of the 7th century B.C.; they show fully developed all the chief elements of the Doric style that persisted for 600 years: the massive Doric column without a base and with a simple capital, the frieze with its grooved triglyphs, the simple cornice with its mutules and guttæ, the stepped base or crepidoma of the temple, its windowless enclosure, the cella, containing the chief hall or naos for the statue of the god, and often behind this a chamber, the opisthodomos; around the whole a colonnade, the peristyle, and above the whole a low-pitched roof of wood, covered with tiles of terra-cotta or marble — these elements remained unchanged, though greatly refined in proportions and execution as the style progressed. This progress was already great by 479 B.C., when Athens, become the leader of the Greek states in the defeat of the Persian invasion, began upon the Acropolis the erection of a group of buildings — the Parthenon, Erechtheum, Propylæa and temple of Wingless Victory — which exemplified the culmination of Greek art. Of the period immediately preceding this are a number of temples at Selinus, at Pæstum in southern Italy, and at Agrigentum and Segesta in Sicily; while between 480 and 450, the fine temples of Zeus at Olympia, of Aphæa on the island of Ægina, and of Heracles (the so-called Theseum) at Athens were built; the last-named admirably preserved to our day.

Meanwhile another style, the Ionic, had been introduced from Asia Minor by the Ionian Greeks. It employed more slender columns and lighter proportions than the Doric; the columns stood on molded bases and bore capitals having large spiral volutes; the frieze was without triglyphs and the cornice without mutules. The moldings were carved with eggs-and-darts, beads, leaves or anthemions, and carved ornament generally took the place of the painted enrichments of the Doric style. The two styles were used side by side in Athens, and while the superb Parthenon (q.v.) on the Acropolis was in the Doric style, majestic in its severe beauty, beside it stood the Ionic Erechtheum in chaste elegance, and a short distance to the southwest the tiny Ionic temple of the Wingless Victory. The imposing gateway to the Acropolis, the Propylæa, presented Doric façades to the east and west, but was divided within into three aisles by two rows of Ionic columns. The temple of Apollo at Bassæ (Phigalæa), by Ictinus the architect of the Parthenon, was in like manner externally of Doric, internally of Ionic design.

The Parthenon, with its superb Doric peristyle — 8 columns in the end façade, 17 in side elevation — and its two internal colonnades of the same order in two stories superposed, represents the culmination of plastic art in this great age. Measuring over 200 by 100 feet on the ground, with massive columns 36 feet high, built of purest white marble and brilliant with red, blue and gold in its upper parts (see POLYCHROMY), it was adorned with sculpture of consummate beauty by Phidias (q.v.) and sculptors under him, and even in ruins to-day offers a model of unsurpassed perfection of proportion and execution, while the Propylæa and the two Ionic temples near it were inferior, if at all, only to the Parthenon in beauty. They testify to the exaltation of the Hellenic spirit after the Persian wars.

III. The Alexandrian Period.— From 400 B.C. to the Macedonian dominion of Alexander (in 330 B.C.) there was a lull in architectural activity. That dominion brought about a revival characterized by splendor and elaboration in place of the earlier reserve and refinement. The Corinthinian column began to be used, more slender and richer in ornament than the Ionic, of which, however, it was really a variant rather than a new style. Magnificent temples were erected, especially in Asia Minor, including two of colossal size — that of Apollo at Didyme near Miletus, and the famous temple of Artemis (Diana) at Ephesus, measuring 342 by 163 feet, one of the «wonders of the world,» with sculptured columns. The tomb of Mausolus at Halicarnassus (the Mausoleum) was another marvelous edifice; these were all three of the Ionic order. The Corinthian appeared in smaller structures, as in the tholos or well-house of Æsculapius at Epidaurus, Doric externally, Corinthian internally; and in the tiny choragic monument of Lysicrates at Athens. From the 3d century B.C. we have the Ionic Propylæa at Priene and two Corinthian gateways at Eleusis; and in the following century the great Ionic altar at Pergamon. Shortly after this the colossal temple of Zeus at Athens was begun in the Corinthian order by a Roman architect, Cossutius, but was not completed until 300 years later under Hadrian, who built also the first arched gateway in Athens and several colonnades. In Asia Minor and in Macedonia a number of temples, gates and theatres were built under the Roman dominion in a style rightly called Greco-Roman.

Secular Buildings.— These were few; the Greek theatre can hardly be called a work of architecture. (See THEATRE). A few colonnades, city gates and walls, the arsenal at the Piræus, and remains of houses of great simplicity, and finally the «Tower of the Winds» — really a clepsydra or water clock — at Athens, make up the list, unless we class as secular the treasure-houses of the different cities at Delphi, Delos and Olympia, and a few tombs at Xanthus, Mylassa, Antiphellos, etc. At Athens, however, are a number of modern buildings in the Doric and Ionic style, possessing much merit, e.g., the Academy, Museum, Zappeion, etc. The ruins of the Odeum of Herodes Atticus at Athens are Roman rather than Greek.

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GREEK ART — PAINTING AND SCULPTURE. Painting.— Modern students of Grecian archæology do not doubt that the Greeks of different epochs were as successful in painting of stately and religious subjects and of painting and drawing in a slighter and more popular way as they were in sculpture; but this is merely an inference. Absolutely nothing remains to us of Greek painting of high class. We can study the figures on Greek painted vases and notice their admirable disposition and the beautiful designs made of their combinations, and we can note the technical system followed, sometimes by drawing on the clay with a hard point, sometimes without that help and drawn evidently with the brush alone. The use of pigment, too, generally black but sometimes of other colors, can be perfectly understood; but this is all of the simplest character, nor can we draw any conclusions at all about the wall-paintings or panel-paintings of the Greeks. In the houses of Pompeii there are many wall-paintings which seem to have had a non-Italian and probably Greek origin, and furthermore it is known that Pompeii was a town of Greek settlement and retained much Grecian influence even under the Roman Empire. Some portrait heads have been found in Egypt painted on panel (that is, thin boards) and these are certainly non-Egyptian; they may be assumed to be Greek, of the Alexandrian epoch. In these, however, there is no background, no added incident, which might guide us to a knowledge of Greek design in Graphic art. Finally, some paintings discovered in Rome, though belonging to houses of late date,

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rades, [illegible] and walls, the [illegible] Piraeus, and remains of [illegible] and finally the Tower of the [illegible] Athens [illegible] up [illegible] cities of Corinth, Delos and Olympia [illegible] temple at Naxos [illegible] Messa[illegible] Athens [illegible] however [illegible] Doric and Ionic [illegible] Academy, Zappeion, etc. The ruins of the [illegible] Hadrian's Arch at Athens are Roman [illegible]

Bibliography.— [illegible] and Revett [illegible] has [illegible] and [illegible] Anderson and Spiers [illegible] Greece and Rome' (London [illegible]) [illegible] 'Greek Refinements' (New [illegible]) [illegible] York [illegible] Architecture [illegible] Greek [illegible] Greek [illegible] and [illegible] Art [illegible] Architecture [illegible] and [illegible] of the [illegible]

A. D. F. [illegible]

Professor of Architecture, Columbia [illegible]

GREEK ART — PAINTING AND SCULPTURE. Painting.— [illegible] of Grecian architecture [illegible] the Greeks at different epochs were as skilful in painting or statuary and [illegible] pieces and of painting and drawing as [illegible] and more popular arts as they were in sculpture but this is merely an inference. [illegible] remains of Greek painting [illegible] the [illegible] and the beautiful design [illegible] This use of [illegible] other colors, can be [illegible] of the [illegible] of the Greeks [illegible] Greek and [illegible] known [illegible] Greeks [illegible] be assigned to Greek, of the [illegible] epoch. In these, however, there is no ground, no [illegible] movement, which might [illegible] us to [illegible] of Greek design [illegible] Finally, some paintings discovered [illegible] Rome, though belonging to houses of the

GRECIAN ART

are altogether Greek in design; and these may well be reduced copies, or imitations, of famous originals 300 years earlier. None of these paintings are of great importance. None of them give us an exalted idea of the painting which stood for their original impulse. The statements made by ancient writers with regard to the paintings of their own time and those who were then famous as having belonged to earlier times, are of very little use, because we have no standard with which to compare their critical remarks, and furthermore because no one of the books remaining to us from antiquity seems to be the work of a man greatly interested in fine art. For this reason the paintings on the vases are worthy of the most minute examination. The earliest style in which the subjects represented are at all elaborate are of the undetermined epoch which we call the Mycenæan. Those vases are rich in patterns of scrolls, bands, zig-zags and spots with, somewhat rarely, animal forms introduced in bands and (as in Crete and Cyprus) as a principal subject and covering a large part of the body of the vase. The painting is generally in brownish red on a dull yellow ground, which is the natural color of the clay. The famous Warrior Vase found at Mycenæ and now in the Central Museum at Athens and which we must suppose to date from 1000 B.C., has much of that grotesque indifference to form and perfect satisfaction with an indication of meaning which we associate with barbaric art in all ages: the human form is drawn without any comeliness or grace and without any success in getting control of gesture; but the purpose is clear, viz., the displaying of a procession of warriors wearing large helmets, carrying great shields of the curious kidney shape long afterward associated with certain Asiatic influences, and carrying spears in the right hand, which spears have sometimes two heads or what seem to be heads.

The paintings on pottery which are of the most interest are those of the period beginning about 600 B.C. and ending about 150 B.C. The earlier pieces are, of course, difficult to date even approximately. They represent warriors engaged in battle, the scene forming a broad band running around the vase; lions, bulls and stags arranged again in horizontal bands; figures draped in long garments, men as well as women carrying stringed instruments, weapons, baskets and the like; ocasionally a scene which can be identified, as where Hercules brings the Erymanthian boar to show to his brother, King Eurystheus, or where Peleus is about to carry off Thetis from among her attendant nymphs; or they represent a feast, with men reclining on couches and others acting as attendants bringing pitchers and vases to fill the cup held by the reclining guest. The beautiful black glaze of the vases is used sometimes as the pigment for the figures and sometimes to work the background around the figures. These two styles are known as the black-on-red or black figure style, the other as the red-on-black or red figure style, and this latter style is known as the later of the two. There is still another form which is generally the latest of all. In this the black glaze is worked over the whole vase except for a panel or medallion or even a band around the vase, which is left in the red color of the pottery, and upon this the figures are painted in black. From the 5th century on the drawing is extremely vigorous and significant. It is grotesque sometimes, as where the muscles are given excessive prominence or where the attitude is exaggerated in the attempt to make it tell the story; but everywhere the drawing of the outline and the filling in with color shows singular mastery.

In a few cases the drawing itself is faultless; but in by far the greater number of cases, even of a good time, it is rather the evidently slight and swift work of a man familiar with nature and with the best traditions of art but not using his whole strength in the slight painting of the earthenware. The use of pigments other than the black glaze is not very frequent; but a red somewhat brighter than the color of the clay is used, also a kind of violet, more rarely a green, and in some cases gilding is applied — especially in late and very elaborate work. A small class of vases, identified with the city of Athens, has the body covered with a solid coat of white, upon which figures are painted in various bright colors; but this work is perishable.

In close connection with the drawing and painting applied to pottery is the engraved work on the backs of bronze mirrors, on pieces of armor, and on cists (*cistæ*). Even as in modern times some of the most elaborate and precious drawing is that of the engraver working on copper-plate (though he proposes to take prints on paper from his engraving), so the Grecian draughtsman put some of his finest work on those engravings meant for pure decoration. As we have no free drawing on paper or plaster or wood — nothing that shows how the Greek drew with a free hand — we can only reason backward from the firm and resolute setting down of lines drawn on the resistant material with the sharp point, and infer the vigor and daring of the more unfettered design.

Sculpture.— Sculpture in its different forms is, after all, that which Greece has left us which is most important. We have the marble reliefs carved upon temples, tombs and the walls of sacred enclosures, and also a great number of slabs which, when more than two or three feet in either dimension are generally tombstones, but which, when small, are frequently mere records carved upon a boundary stone or a memorial, or else a votive slab dedicated at the shrine of some divinity. In all of these the propriety and the freedom of design are wonderful and, in relief sculpture at least, the Greeks have set an example which has never been equalled since, neither in the actual beauty of the form nor in the intelligence shown in the composition. The most wonderful of the low reliefs are those of the famous frieze which forms the crowning member of the wall of the Parthenon within the screen of columns, the wall of the naos or cella. The well known fact that this whole composition was painted in bright colors changes at once our ideas as to its decorative effect as a part of the building, but modern students can form no correct idea of the appearance of elaborate sculptures painted in an artistical fashion because they have never seen anything of the kind. One special reason why the reliefs are peculiarly important to modern students is their undoubted originality. The sculptures found at Phigalia, at Halicarnassus, at Xanthos, and at Gjolbaschi in Asia Minor are the undoubted work of the 4th and 5th centuries, and moreover they were designed for the places in which we now find them. This is not so with statues and busts, for of all the great world of Grecian statuary only three or four undoubted originals of the first rank remain. The Hermes of Praxiteles was found as Pausanius saw it in the 2d century A.D.; the Winged Victory of Paionios also; and these two were found in the excavations at Olympia in Greece. Statues of somewhat less importance have been found in the islands of the Greek archipelago and in specially protected underground chambers in the mainland of Europe, and a number of splendid bronzes were found in a single great country house at Herculaneum near Naples; but as a general thing it has to be settled by internal evidence whether the piece discovered is of unmingled Greek character or of a less simple and perfect later style. The statues of the pediments, however, those which once stood at either end of the Parthenon, the temple of Zeus at Olympia, the great temple of Ægina, and those which seem to have been placed between the columns of the Nereid Monument at Xanthos, are almost as certainly of their apparent epoch as are the bas-reliefs of the same buildings. In this way we have a score of fairly complete marble statues, two or three bronze statues of the highest rank, and a dozen less important ones, a score of life-size busts, and many smaller bronzes, all of which are assuredly of the best time of Greek art. Our knowledge of this subject is greatly helped by the study of engraved gems and coins. The gems were used for seals, or set in finger rings worn hung by a string, and the materials used were, of course, very hard stones, such as chalcedony and sardonyx; though glass was used also, and some seals are engraved in gold. The figure engraved in intaglio can be seen as if in relief when the stone is transparent and is looked at from the back. But commonly the student takes a cast in plaster or wax and studies that relief together with the original hollow sculpture of the gem. The number of these gems in our public and private collections is very great, even if we consider only those of undoubted Grecian origin. The coins are, in art, of the same character as the gems, because they are struck from a die, which die has been engraved in the same way in which the intaglio in hard stone is engraved; that is, the artist in either case keeps in mind the future relief and carves his hollow or sunken design rather with a view to its utility as a die than as to its own appearance. Greek coins are the subject of much and careful study among modern students. Greek sculpture includes also the earthenware figurines which have been found in great number in the neighborhood of Smyrna, in Sicily and the other islands of the Mediterranean, and especially in the neighborhood of Tanagra in Greece.

The years since 1850 have been rich in books on the subject of Grecian archæology, which archæology is, in great measure, the study of the existing works of art; books on Grecian vase-painting, gems and coins are to be counted by scores and hundreds. The latest are generally the best to begin with. The student will find in them the best means of judging what earlier books he may need; and at the same time he will find the latest discoveries and the most mature opinions of archæologists. The same remark applies to the periodicals, of which there are many and very valuable, for indeed much of the comparative study of this subject has been carried on in the columns of German, French and English periodicals, often issued by learned societies.

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GREEK CULTURE. This term properly embraces all the activities of the Hellenic race throughout all ages, with the influence of the Greeks upon other peoples and civilizations. A rapid survey can include only what is typical of the best periods, and a few aspects of Greek tradition and influence.

Fifty years ago, Greek civilization seemed an inexplicable phenomenon, conditioned, indeed, by the geography and climate of the eastern Mediterranean, yet not derivative in the usual sense, since the early culture of Egypt and Asia Minor would not account for it, while to Thrace the Greek owed little more than an earnest desire to escape from Thracian barbarism. Of late, however, we have become aware of a vast pre-existent Ægean culture, having centres not only at Argos, Mycenæ and Orchomenos, and in the Troad and Crete, but extending from the Archipelago to Syria and other distant shores of the Mediterranean. Archæology has pushed back the origins of Hellenic culture six thousand years or more; and if it does not explain the Greek genius and Greek art (since in art and genius there is always something that defies analysis), yet, by affording glimpses of age-long preparation, it satisfies the mind that is accustomed to the notion of simple origins and a process of evolution. Even so, in contemplating the efforts of the Greek genius, we should doubtless suspect the bias of our day, and be ready to credit more rather than less to the originating power of great individuals, and to the mutual inspiration of gifted men, in groups, as compared with the vague effect upon them of the masses.

Explain the origins as we may, two periods stand out pre-eminent in Hellenic civilization: the Homeric age, approximately the 10th century B.C.; and the age associated with the name of Pericles, an interval of 100 years or so, beginning about 440 B.C.

The Homeric Iliad and Odyssey represent the flower of early Hellenic culture. They were not, as Lord Macaulay thought, the outcome of heroic barbarism; certainly they evince no unsophisticated art. Rather they seem to have appeared near the end of a high stage of civilization, possibly as it began to decline; though they idealize the life of a more heroic past. As to their origin, modern scholarship is now veering again toward the ancient belief in the existence of a gifted poet who may have composed both epics. True, there is in the Odyssey a difference in tone which led Longinus (or whoever wrote the treatise 'On the Sublime') to ascribe this poem to the old age of the author; and there are grounds for believing not only that the Iliad is an earlier production, but that more than one hand may have been concerned in giving it the form it now possesses. But in any case, the Iliad, and still more the Odyssey, betray a wonderful command of metrical composition, a vast knowledge of history, geography, tradition and myth, extraordinary insight into the ways and motives of men, and an ability to unite all these poetical resources into a single plot for the attainment of a designed artistic end. In structure the Odyssey is more perfect than most of the dramas of Shakespeare and the works of virtually all modern novelists. Such an art no doubt is unthinkable in a poet working in isolation, without predecessors to learn from and contemporaries to inspire and appreciate him. Accordingly, we must imagine a school of Ægean bards who gave rise to at least one superlative genius: Homerus, "he who fits together" — a maker or fitter, not merely of verses, but of characters and incidents into one orderly plan with a beginning, middle and end. The final measure of Homeric civilization is the poetic art to be seen in the two epics, from which, centuries after, the Aristotelian theory of poetry was largely deduced. But we have evidence that the Homeric age possessed also a noble architecture, knew the art of writing, was skilled in weaving tapestry, was expert in metal work and woodwork, understood landscape gardening and road-making as well as sculpture, and had developed a seemingly naïve, but very subtle eloquence. To judge from its two great epics, the age was benevolent toward religious tradition; not atheistical, but employing the tales of the gods in no very edifying way. The Olympians are brought down not quite to the level of the heroes, while the heroes are elevated until, in conduct if not in power, they move on a plane not much lower than the gods as agents in the story. More important than all else, then, the Homeric age transmitted to that of Pericles ideals of human conduct — bravery and endurance in time of war, good counsel and fidelity in time of peace; at all times courage for individual achievement, coupled with reverence and an instinctive feeling that communal interests are supreme.

The age of Pericles is justly regarded as attaining the high-water mark of Greek culture. At this time Athens became the chief city of Greece and the centre of Mediterranean civilization. Here the various excellences of the several Hellenic stocks, Doric, Æolic and Ionic, were tempered and united in one superior blend of character. Here the streams of dialect merged into one clear, vigorous and beautiful medium of expression, the Attic. Here the early systems of philosophy which had arisen in distant Asia Minor or near-by Megara were sifted and incorporated in the native systems of Socrates, Plato and Aristotle. Here was developed tragedy; hither came comedy from Syracuse. Here the Homeric poems were learned by heart as the one basic element of education; and tragedies founded upon stories from the great epic tradition became familiar to a populace, large numbers of whom in course of time took part in the choruses. In this period, Athenian life was characterized by the dominance of a regulated imagination in every sphere of activity, and by a complete interpenetration of theory and practice. Imagination, hand in hand with reason, appeared in the ordering of the state, in the development of commerce and colonization, in the public festivals and religion, in the consummation of every fine and every useful art. In fact, the distinction between fine and useful art was not observed, so that even the commonest utensils became objects of beauty, to be wondered at by subsequent ages. For the simultaneous flourishing of sculpture, painting, architecture, music and poetry, no other age can be compared with this, unless, perhaps, the 13th century of our era. But in Greece the arts subsisted in closer combination with each other, with the functions of the state, with religion and with life. Witness the Attic tragedy and comedy, which arose in the worship of Dionysus, and were associated with the chief religious festivals and processions; were exhibited in a theatre which was virtually a temple of the god, a masterpiece of architecture in marble, capable of holding a large share of the free populace at once; were supported by a state that supplied every citizen with the price of admission; were produced by poets who took part in the acting as well as in training the actors, and who were eligible to any office in the democracy — as Sophocles was appointed one of the ten generals who led the expedition against the revolt in Samos; were attended by strangers from every part of Greece — serving to unify the Hellenic consciousness; and in fact combined in one our modern drama, opera, dancing and lyrical poetry, with the embellishments of the best landscape painting and artistic costume.

But Greek civilization was something more than what the Greeks actually accomplished, in art, or in commerce, or in statesmanship. The creator is greater than his works. More important than what they wrought were the agents, the men themselves, with their ability to produce both these and other works — with their unlimited capacity for contemplation and construction — for the highest kind of action, the orderly life of the spirit. Greek civilization means Phidias and Praxiteles, the sculptors, rather than the small part of their work now remaining. It means Ictinus, the architect; Socrates, Anaxagoras and Plato, the philosophers; Pindar, the lyric poet; Herodotus and Thucydides, the historians; Demosthenes, the orator; Aristophanes, the comic poet; Æschylus, Sophocles and Euripides, the masters of tragedy; and Pericles, the statesman, the artist and philosopher in government. There were also strange, indecent men, like Diogenes; and bad or irresponsible men, like Alcibiades and Cleon. Yet on the whole the Athenians maintained a norm of good and beautiful conduct, observing measure in all things, even while devoting themselves each to his chosen way of life and communal service; for the life of the individual was subordinated to the welfare of the state, and found complete realization therein — the state did not, as in modern times, mainly exist for the sake of the individual.

From this wonderful group and succession of gifted and cultivated men, whose activities really constituted the essence of Greek civilization, it is customary, following the example of Thucydides and Plutarch, to single out Pericles, leader and conserver of the Athenian polity, as the representative citizen and the type of Hellenic culture. Grave and reserved, fearless and eloquent, combining judgment with imagination, intelligence with sentiment, forethought with passion, of commanding presence, endowed, as it seemed to his fellows, with every physical excellence and power of mind and possessed of the good breeding which is the crown of virtue, he might well have sat for the character-sketch of the «Highminded Man» that is drawn by Aristotle in the ‹Nicomachean Ethics.› But for our purposes of illustration the magnanimous Sophocles may serve even better. For, first, he is a poet, or «maker,» *par excellence;* and examples of his work are still intact — while the Periclean state came to a sudden termination. And secondly, it is easier to compare him with other typical Greeks, since he occupies the place of a golden mean betwixt the religious Æschylus, who «did right» as a dramatist «without knowing why,» and the rationalist and realist Euripides, who drew men «as they are»; whereas Sophocles, as he himself was aware, proceeded aright from correct principles of art as well as correct sentiments, and, observing men and human life even more truly than did Euripides, nevertheless properly idealized his characters for the ends of tragic representation. As in his own life, so in elaborating his dramas and in the very process of displaying the misfortunes of a self-blinded Œdipus, he shows how the artistic regulation of impulse leads to success and happiness. Nor did his fellow-Athenians blunder in their estimate of him, for in the dramatic contests he secured first prize no fewer than 20 times. Moreover, in the comedy of the ‹Frogs,› Aristophanes, with his keen eye for disproportion, ridicules Æschylus somewhat, and Euripides yet more, for departing on this side or that from the golden mean, while he significantly refrains from attempting to distort the work of Sophocles.

As a typical Greek, Sophocles is religious; not, like the Athenians in their later decadence, «too religious,» as Saint Paul described them. He is also many-sided, with a number of diverse faculties ready for the accomplishment of both his immediate and his final aim. But the unity and compactness of structure in his ‹Œdipus Rex› or his ‹Antigone› reflect the inner unity of spirit in the author. Sophocles knows when to amplify and when to inhibit; he is equally sensitive to broad perspective and to the value of each detail. His vision is steady and comprehensive, as a comparison of the eighth Psalm, in the Bible, with his chorus on man, in the ‹Antigone,› will disclose. He has formed a just estimate of the relation between external nature, mankind and the Divine. In the delineation of character he has never been surpassed, yet his plays do not, like those of Shakespeare, fail to take direct cognizance of the action of a higher Divine power (not merely of an impersonal moral law) in the affairs of men.

But the typical Greek has his limitations. Although Homer and Sophocles have a sense of the Divine in relation to human life, they are both polytheistic. Though in both we find ideal relations between men and women represented or suggested, and though Athens and the Parthenon by their very names imply a lofty conception of womanhood, Greek society was disfigured by an attitude to homosexual impulse that often resulted in words and actions at once base and grotesque; nor should one forget that the leisure of cultivated men was made possible by the labor of slaves. And though both of these poets attribute human failure to human blindness of heart rather than to fate or divine prejudice, the Greeks did not in the main identify divine providence with divine good will. Æschylus, it is true, may almost be termed monotheistic; and Plato has been called by the Jews themselves the Greek Moses, as by English scholars he has on occasion been styled a Puritan. But Æschylus said that his plays were only morsels from the Homeric banquet, while Plato, in spite of the criticism passed on the ancient epic poems in the ‹Republic,› is heavily indebted to them, and, closely as he approaches Hebraism or the modern spirit in his deepest reflections, he still remains a pagan. It was left for the Hebrews and Christianity definitely to assert a pure monotheism for transmission to modern times; to develop the idea of the fatherhood of God; and thus to establish upon a firm foundation the principles governing the relations between men and women, women and women, men and men. Again, the joyous Greek was not the joyful Christian; nor was death to him the beginning of life. And again, the mediæval doctrine of «the gentle heart,» from which our modern conceptions of lady and gentleman are mainly derived, was neither Greek nor Roman. While these conceptions owe much to classical antiquity, to the Homeric and tragic heroes and heroines, to the «Highminded Man» of Aristotle, to the Virgilian Æneas (who was borrowed from the Greeks); they owe more to the Provençal and Italian, and to the Germanic and Celtic, attitude to woman; at the core they are Christian.

The Greek culture of the most vital period has been handed down to us by intervening civilizations. From Greece it passed to Alexandria, and from Alexandria to Rome. Græco-Roman culture was succeeded and preserved by that of Byzantium, and then, during the decay of learning in southern Europe, was preserved in Ireland and England and in Arabia and Syria, whence it returned to the Continent in the later Middle Ages. It has on three occasions reasserted itself with special force: at Rome under the Emperor Hadrian; in the 13th century in Europe; and again in Europe beginning with the Italian Renaissance, this last, however, being mainly Latin in character and but secondarily Greek. Still, if we regard the Renaissance as extending to our own day, we find a better and better understanding and assimilation of Hellenism, until in poets like Shelley and Goethe we discover an approximation to the Greek spirit almost as close as that achieved by the Roman Cicero, Virgil and Horace. All five are, so to speak, not Greeks proper of the triumphant age, but, like Lucian and Plutarch, late and provincial imitators — who nevertheless have in them something of the original Hellenic genius.

What has Greek culture done for the world? Shelley in his enthusiastic way exclaims: "We are all Greeks. Our laws, our literature, our religion, our arts, have their root in Greece. But for Greece, Rome — the instructor, the conqueror, or the metropolis of our ancestors — would have spread no illumination with her arms, and we might still have been savages and idolaters; or, what is worse, might have arrived at such a stagnant and miserable state of institutions as China and Japan [in 1822] possess." If pressed, Shelley would have to admit that European law was the invention of Rome; and that, so far as concerns religion, the function of the Greeks under the Roman Empire was that of formulating and transmitting, not of producing it. The Christian liturgy may have originated among Christian Greeks; ecclesiastical music is essentially Greek; the most original literary efforts of the early Christian era, the hymns, were composed, some in Greek, and some in Latin; and the New Testament was written in the commercial Greek (adapted) that had spread during the supremacy of Athens, and was the general means of communication for the eastern Mediterranean. For all that, the customary attribution of intellectual culture to the Greeks, and religious culture to the Hebrews, is in the main justified — if we remember that the difference between the two races is one of degree and emphasis rather than kind, that the Greeks were not unreligious, nor the Hebrews unintellectual. Strictly considered, the gifts of the two races to civilization cannot be regarded apart. Thus, as Renan points out, the Hebrews discovered various literary types as well as the Greeks. And yet we are safe in deeming the main literary types, and, as Shelley says, the arts in general, a bequest of the Greeks to the world. It was they who provided the models which have aroused the enthusiasm of mankind; for the epic and mock-epic, the poems of Homer; for tragedy, Æschylus and Sophocles; for romantic tragedy and tragi-comedy, Euripides; for political comedy, Aristophanes; for the character-sketch, the rhetoricians and Theophrastus; for domestic comedy, Menander; for history, Herodotus and Thucydides; for the dialogue, Plato; for the oration, Demosthenes; for lyrical poetry, Pindar; for pastoral, Theocritus. The satire, so far as we know, was another invention of Rome. But what is often thought to be the peculiar type of modern literature, the prose novel, nevertheless has its prototypes in the last production of the Greek genius, the romances of Heliodorus, Achilles Tatius and Longus. Even our scientific monographs, and the various types of literary criticism, in verse as well as prose, go back to Aristotle and his successors at Alexandria. In the main, Greek art has given us a conception of orderly structure, when we have been willing to accept it, pervading all human activity and achievement. The Greek, in his city-state built upon a hill, developed a sense for architecture which reappears in every other art and in all domains of life. The words and sentences of his oration or his drama are arranged like the stones in each section of his citadel and hill-crowning temple, and the several parts are fitted together in order due, like the face and divisions of the Parthenon. The nomadic Hebrew originally dwelt in tents under the stars of the desert. His architectonic sense is relatively weak. But his Psalms have expressed the grief and exultation of mankind; it is he who gave the final meaning to the Greek *Logos*, the Word incarnate and undying; and the Greek words Christ and Christian take us back not only to Rome and Greece, but, through Rome and Greece, to Palestine. In any case they lead us to the Mediterranean sources of all modern civilization.

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GREEK DRAMA, The. Greek drama had its origin in immemorial religious observances; and it never became entirely separated from religion. Among all the Greek gods none appealed to the imagination more vividly than the youngest — Dionysus, the god of wine. Greek tragedy was simply a form of worship, the ritual cult of this god, who made the initiate wise and the ungodly mad. It was Dionysus that spoke most strongly to the sense and at the same time to the spirit. The story of his adventures was replete with joy and sorrow. Under some aspects it was a "passion," under others a triumph, and all the other passion plays since, even the spectacle at Oberammergau, are in the ancient spirit. One Dionysus after another has been substituted, but from the first there has been a desire on the part of the worshipper to realize his god vividly, with thrilling nearness, to partake of his joys and sorrows and triumphs. But Dionysus was always represented as being more nearly akin to man than the greater deities; and the burial of the wine in the dark tomb of the jars through the winter symbolized the new awakening of man himself, the resurrection of the devotees of the god to a fuller and more joyous life. But wine was not the only manifestation of the god: oil and wheat were his; he was the giver of physical joy and excitement,— in short, the god of life. So we find diverse elements in the original drama: Thracian orgies and mysticism, the rustic gayety and joyous intoxication of the Greek peasant, and the religious conception of certain laws of nature, such as germination and extinction, fructification in its widest aspect, whether in the bursting of the seed-grain lying in the earth, or in the generation of living creatures. One of the most prominent exponents of this power was the goat, which was sacred to Dionysus. From the Greek word for goat (*tragos*) and song (*odé*) our word «tragedy» is derived. Hence, too, the prominence given to the *phallus* in the solemn processions in honor of the god. Certain woodland creatures, with pointed ears, snub noses, spindle shanks, shaggy hair and goat tails (satyrs) also belonged to the train of the god. *Tragedy* (goat-song), *comedy* (village-song) and the satyric after-piece all have their origin in this early Dionysus worship. Later the sufferings of other gods were presented at the festivals of the god and finally the representation was extended to the heroes and heroines of the past.

The Beginning of Greek Drama.— The original element in Greek drama was choral dance and song. Epic poetry was written in Ionic, choral poetry in Doric: the Attic genius blended the two into a new poetic form. Aritistic drama was the creation of Athens. The cyclic dance and song in honor of Dionysus was called the dithyramb, which was first raised to a high artistic level by Arion, of Lesbos, who later lived in Corinth. He elaborated the choral hymn and fixed the number of the chorus at 50. He also gave a distinctive character to the evolutions of the «cyclic» chorus, as it was called, and to the manner of performance. Arion dressed up the members of this chorus as satyrs and had them sing of the adventures and sufferings of their leader, Dionysus, who was described as traversing Asia from India westward in a triumphant march and establishing his worship in all the countries through which he passed. In the dithyramb, as developed by Arion, we see the germ of Greek drama. In his chorus do we find for the first time an attempt to *act*, in contradistinction to the simple narration of a story, as in the epic of Homer. But the acting was not carried beyond the point of impersonation.

Athens and the Drama.— The beginning, then, was made in Corinth, a city that did much for Greece. But it was in Attica that the next steps were taken. The Athenians were content to import their ideas as well as their seed corn. The rocky ground of Attica was not adapted to the growing of wheat, but it was adapted to the cultivation of the vine and olive; and the preparation for the seed of tragedy, whose home was in the country about the Isthmus, had been going on for centuries in the soil of the Greek nationality. The first artistic Athens was that of Pisistratus, the first literary Athens that of Solon, in the 6th century, but even this great time was only an earnest of greater things to come, only foreshadowed the unsurpassed excellence in art, architecture and literature soon to be manifested by the Athenians in consequence of their natural genius, their high intellectual endowments, their innate love of beauty and symmetry, their training and education, for which a free government gave them every opportunity, the sudden increase in wealth and power which followed hard upon their success in the struggle with Persia, and, finally, that great burst of national enthusiasm which succeeded the glorious triumph over Oriental pride and the narrow escape from despotism. In no other soil could the seed of drama come to full fruition. Athens was now no longer an insignificant state. She had suddenly become strong, and was thoroughly imbued with a sense of her importance and of her measureless possibilities. Her peculiar location, as well as her great facilities of transportation, made access to other peoples and to other ideas easy. Poets, artists, statesmen and professors of wisdom gravitated toward the city which was fast becoming the metropolis of the world. But Athens remained herself: she was neither absorbed nor overwhelmed by the influx of visitors and foreign residents. The citizens had a passion for the honor and glory of Athens. No time could have been more favorable for the birth and development of the real drama.

The Attic dialect was a modification of the Ionic, but was not so effeminate as the parent speech, nor yet so harsh as the Doric; it was rather a golden mean between the two, as the Athenian himself was not so crude, rough and rigid as the Dorian, and, on the other hand, not so flexible and pliant as the soft and effeminate Ionian. The Attic dialect, as developed in tragedy, became the standard Greek language, though Doric (which was the dialect employed in the original choral hymn) was still used in the lyrical parts of tragedy, and Ionic and Epic forms were introduced into the dialogue for the purpose of heightening the color and marking the language more distinctly from prose.

There was one district in Attica especially in which the worship of Dionysus had a strong hold on the people. This was the canton Icaria, on the slope of Mount Pentelicus about 12 miles north of Athens. A native of this district, Thespis by name, who lived in the middle of the 6th century, made an important innovation in the presentation of these embryonic tragedies: he had certain individual satyrs step out of the chorus at some point of the performance and recite verses addressed to other satyrs. This is no longer mere impersonation, but the introduction of a new element — real acting. Dialogue is thus added to epic narration and choral singing. But the performances were obviously still very crude. It was not till the seat and centre of tragedy was transferred to Athens that real progress was made. This occurred in 534 B.C. The first performance was given under the patronage of Pisistratus. From this time the development was rapid.

The drama of Thespis was neither tragedy nor satyric drama, but the common ancestor from which both these forms were evolved. To Pratinas of Phlius (500 B.C.) is ascribed the invention of satyric drama, as a writer of which he was very famous. The subjects of this drama, which later was enacted regularly as an afterpiece to the trilogy, were of a lighter kind. The chorus was the centre of Greek drama, and as the satyrs were traditionally an idle, rollicking, mischievous race, serious reflections were out of place. With its playful chorus and its comic Silenus the satyr drama was unlike tragedy; but it was also unlike comedy.

The incidents were often grave, and it contained nothing which approached the parody of comedy. The only extant play of this kind is the ‘Cyclops’ of Euripides, the humor of which is quiet and somewhat suppressed. We have little information about those of Æschylus and Sophocles, but that little leads us to believe that they contained more horse-play and were rather coarse. Another famous writer of satyr plays was Choerilus, who competed with Æschylus in 500 B.C.

Innovations.—About this time Phrynichus of Miletus began his innovations. We know little about his life and activity, but he was undoubtedly a man of great boldness and originality. To him Greek tragedy owed much of the progress it made before the time of Æschylus. He made the bold venture of abandoning not only the myths connected with Dionysus, but of abandoning myths altogether, and of taking for his themes historical events. The names of two of these have come down to us. In his ‘Capture of Miletus’ he so affected his audience that the Athenians fined him for reminding them so vividly of their misfortunes. Later he produced the ‘Phœnician Women.’ This was probably in 476 B.C. His treatment of the subject shows great artistic power. But even in Phrynichus we have as yet no real drama. His tragedies must have been little more than lyric cantatas. Nevertheless, Phrynichus was an innovator and made many improvements. For example, he not only developed the music and the dances, but also introduced for the first time female characters.

These were modest beginnings; but in art nothing is small. The next great name is Æschylus, who may be called the real founder of tragedy. (See ÆSCHYLUS). Aristotle says in his ‘Poetics’ (4, 11–14): “The number of actors Æschylus first advanced from one to two; he abridged the chorus and gave the dialogue the principal rôle. Sophocles introduced three actors and stage decorations. Further, the originally short fables acquired a proper magnitude, and the number of episodes was increased. As tragedy developed from the satyric drama, it was late before it threw off comic language and assumed its proper dignity. Iambics displaced trochaic tetrameters; for originally trochaics were used because tragedy, like the satyric drama, was composed for dancing. But when dialogue was introduced, nature pointed out the appropriate metre; for of all metres the iambic is the most colloquial.”

A third actor was introduced by Sophocles, about 468 B.C. He also increased the number of the chorus from 12 to 15, although in the earlier plays of Æschylus there was a much larger number, as, for example, in his earliest extant tragedy, ‘The Suppliants.’ Æschylus also wrote his plays in trilogies, that is to say, three plays acted in succession, the second being a sequel to the first, and the third a sequel to the second. With the satyric drama full of burlesque and ribaldry, which regularly followed the trilogy to relieve the tension of the audience, the combination was called a tetralogy. Sophocles, however, abandoned the trilogy, and while he produced three plays acted in succession, there seems to have been no nexus between them. Sometimes there was a change of scene in tragedy, and, more rarely, in comedy. This usual adherence to one place for the action, which was fixed by the presence of the chorus, was called the “unity of place.” The rule of “unity of time” was more strictly observed than in modern drama, though by no means so strictly as is commonly supposed. The “unity of action” is of universal application, resting upon the fundamental principle of dramatic art that every part of a play must conduce to a common end and to the development of the main theme.

Tragedy.— Most of the subjects of Greek tragedy are taken from the poems of the Epic Cycle, and almost all the rest from the legendary history of the heroic age. The scenic appliances were partly invented by Æschylus, partly improved and completed. He paid great attention to detail. Of the three great tragedians Æschylus was the most practical: he superintended the performance, the arrangement of each part, the decoration of the stage. All the machinery requisite for his gigantic productions was carefully studied. Nevertheless, his drama reached farther than his scenic representation. The Athenians were born debaters, and the elevation of this inborn capacity to the higher ranges of art was the work of Æschylus; he was practically the creator of the dramatic dialogue. None of his successors ever equaled him in inventiveness; none surpassed him in the variety and artistic arrangement of rhythms. Æschylus crystallized the language and developed a lofty style; and, with a single exception (the ‘Persians’), he selected his themes exclusively from the heroic myths. Æschylus really marks a greater advance on Phrynichus in the development of tragedy than Sophocles on Æschylus. Henceforth the chorus forms, in a certain measure, an ideal public, which participates in the action as a sympathizing witness. Though the drama has its origin in religion, its development and perfection is due to art. The art-form was completely developed by Æschylus. The next great dramatic artist was Sophocles. The changes attributed to him in the external economy of the stage are not great: the temper and tone of tragedy is changed; the actors are made to play better; the material is narrowed to the compass of a single tragedy; the characterization becomes sharper; the dialogue moves more briskly; and the action becomes more complicated, the meshes of intrigue finer. The effects of Sophoclean scenes can hardly be comprehended to-day: tableaus, full of horror or pathos, which the noble grace of the actors' movements made more expressive — a calm and simple unfolding of a simple story, constructed with consummate art, each part of which contributed to the beauty and perfection of the whole. The chorus still respond to the action, as the strings of one lyre vibrate when those of another are struck; but the lyre simply reflects, no longer bears the piece. The plot, on the other hand, was developed with the most exact thoughtfulness. How subtly the plot is articulated is seen best in Sophocles' ‘King Oedipus.’ But it is particularly in dramatic psychology, in the portrayal of character, that Sophocles marks a distinct advance on Æschylus. Euripides, the third of the great triad, brings his poetry nearer earth, but he does not differentiate his characters so well as Sophocles. Æschylus evokes fear, Euripides compassion, Sophocles both, and in due proportion. If one can read but one great tragic poet of Greece, he should select Sophocles, who has his inevitable perfection. Theoretically he is the chiefest of the three. He is the one consummate master of style, versification, melody and vocabulary, who always maintains a noble Homeric grace, and never sinks below the calm level of high art.

The dramatic performances were given at two yearly festivals, the Lenæan, in January, and the city Dionysia in March. (See GREEK FESTIVALS; GREEK THEATRE, THE). Most of the villages in Attica had their local festivals in December, called the Rural Dionysia.

Comedy.— Comedy was twin-born with tragedy, for it sprang from the same worship of Dionysus; but it was longer in reaching a high stage of development, so as to be recognized as a distinct branch of literature. From early times Dionysus was celebrated by revelers, who sang impromptu songs at his festivals. Such a band was called a *comus*, and the song was called a *comus-ode*, «comedy.» This was first developed by Susarion of Megara. He introduced his performances into Attica, first at Icaria, the birth-place of tragedy. But the real founder of comedy was Epicharmus of Sicily. He it was that introduced the plot, or at least developed the rude series of burlesques into a kind of artistic form. The next step was taken at Athens, and the principal poets were Magnes and Chionides. The number of actors was restricted to three, while the chorus consisted of 24 members — just double the number in early tragedy. The three greatest comic poets were Cratinus, Eupolis and Aristophanes. Comedy, transplanted to Attica, and here developed, formed after 465 B.C., a component part of the Dionysiac festival. Its chief object was to provoke mirth and laughter, but it had also an earnest patriotic purpose. As Jebb says, «Comedy is a public commentary on the every-day life of Athens, in great things and small. Politics and society, statesmen and private persons, are criticised with unsparing freedom. The satire is unscrupulously *personal* . . . the poet had, as it were, a public charter to speak his whole mind to the citizens. . . . The special weapon of old Attic comedy was its power of holding up a man or a policy to admiration or ridicule before some 20,000 legislators.» At some point in the play — usually toward the middle — the chorus faced the spectators. This was their *parabasis*, or coming forward to the house. The leader then addressed the audience in the name of the poet, who set forth his views on public affairs or his merits or grievances. In Aristophanes, the greatest comic poet of the ancient world, there is «a play of fancy as extravagant as in a modern burlesque; the whole world is turned topsy-turvy; gods and mortals alike are whirled through the motley riot of one great carnival.» More and more comedy turned its attention from ridicule of public men (the license for which was more than once restricted by legal enactment) to a description of private affairs. So arose the so-called New Comedy. The Middle Comedy (390 to 320 B.C.) marked the period of transition from political to purely social comedy. In this the element of choral music disappears. The New Comedy (320 to 250 B.C.) was somewhat like our comedy of manners, or the German *Lustspiel*. (See DRAMA). Consult Donaldson, 'The Theatre of the Greeks' (8th ed., London 1875); Flickinger, 'The Greek Theatre and the Drama' (1918); Haig, 'The Tragic Drama of the Greeks' (Oxford 1896); Hastings, 'The Theatre: a History of its Greek and Latin Origins' (London 1901).

JOSEPH E. HARRY.

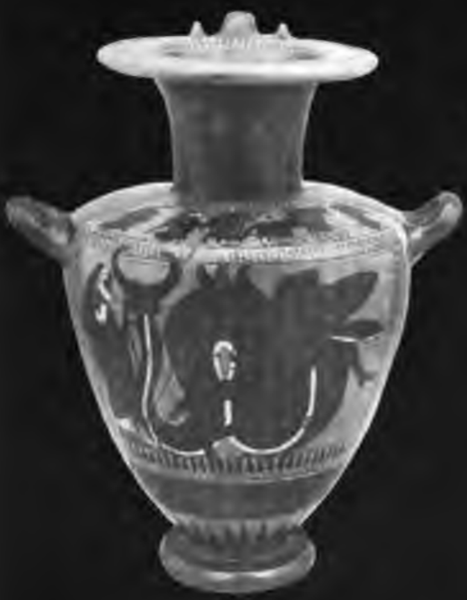
GREEK AND ETRUSCAN POTTERY.

Dr. Schliemann, in his noted excavations at Hissarlik (ancient Troy), brought forth in the lowest (oldest) stratum crude black, handmade, sunbaked pottery. It is supposed to be about 3,000 years old. The stratification next above this held polished black earthenware with crude raised and incised decoration filled in with white. Some pieces were turned on the wheel; some vessels have crude human and animal forms. In the Cyclades (at Thera) well-executed pottery has been found; some turned on the wheel and baked in furnaces, with decoration in white, red or black. These date from 2500 to 1600 B.C. The decorative motifs, quite naturalistic and well-drawn, are seaweed, cuttlefish, nautilus and other marine subjects. Other quite recent discoveries on the islands of Rhodes, Crete, Cyprus, in Attica, Bœotia, etc., give us some knowledge of the products from about 2000 to 1500 B.C. Crete evidently was the centre of this remarkable Bronze Age culture (termed Mycenean Period).

Minoan Period.— Called also Cretan Period. Excavations made under the ruins of the palace of Knossos (ancient capital of Crete) brought forth unglazed, handsome pottery with primitive ornament (scratched lines, punctuations, etc.) filled in with chalk and line decoration in colors. These are said to date earlier than 2000 B.C. Later ware found has light colored ornament (whorls, angles, etc.) on a ground of black varnish, also black painting on bare red clay ground. These pieces show fine technique; some are as thin as the finest blown glassware. They consist of bowls, wine-pots, amphoræ, tableware on «high supports.» Rims are sometimes waved. Decoration is in red, yellow, orange and white, on brown or greyish-black body. The latest pieces appear to date about 1600 B.C. The most remarkable of these «palace» ware pieces are the funnel-formed, footless vases; they have decoration of conventional and natural flowers, rosettes, birds, fishes, shellfish, etc., in bright colors on lustrous black ground — an effective contrast. Colors run to yellow-ochre, brick-red, purple-red, milky-white, while the body is buff color. Most pieces are turned on the wheel. This ware is termed *Kamaræs*, because first found in a grotto at *Kamaræs*. The above wares belonged to what has been classified as the Prehistoric Period.

Corinthian Style.— The earliest of this archaic Greek pottery shows Egyptian tendency in decoration, later followed by figures of animals or the Sphinx taken from the older Oriental period. Then followed single mythological figures with name inscriptions, later came hunting scenes, dancing groups of nude males and females (former often Satyrs), a youth riding or walking alongside a horse, etc. While the main composition of the figures is painted in black varnish on the red clay body, sometimes white and purple details (dress, features, etc.) appear, also incised lines indicate muscles, etc. White pigment on the red ground is used for the nude parts of women, for

GREEK VASES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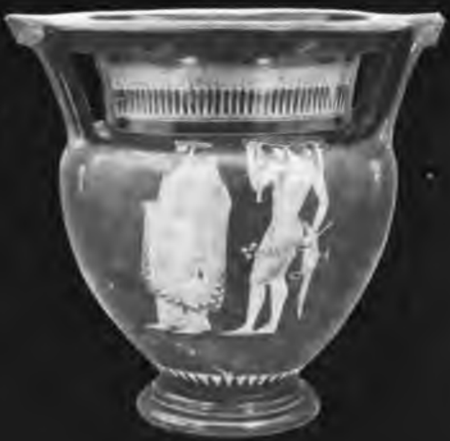
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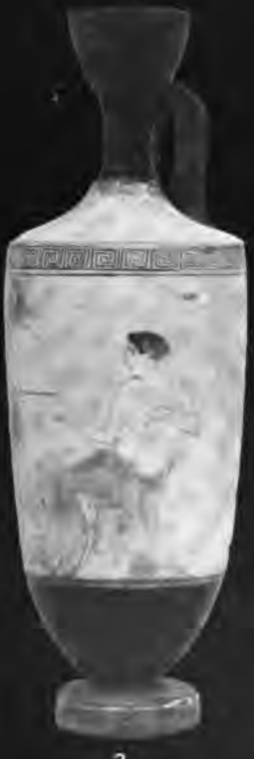
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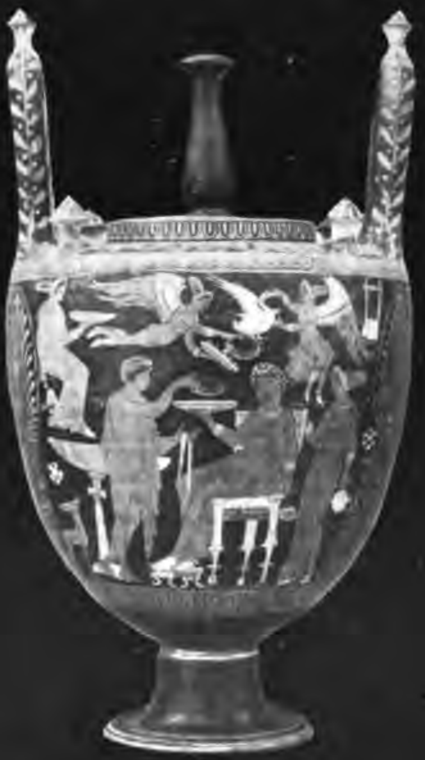
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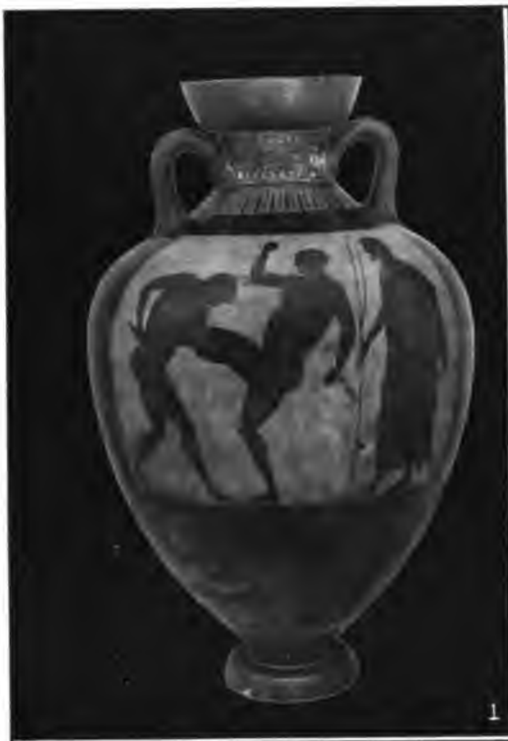
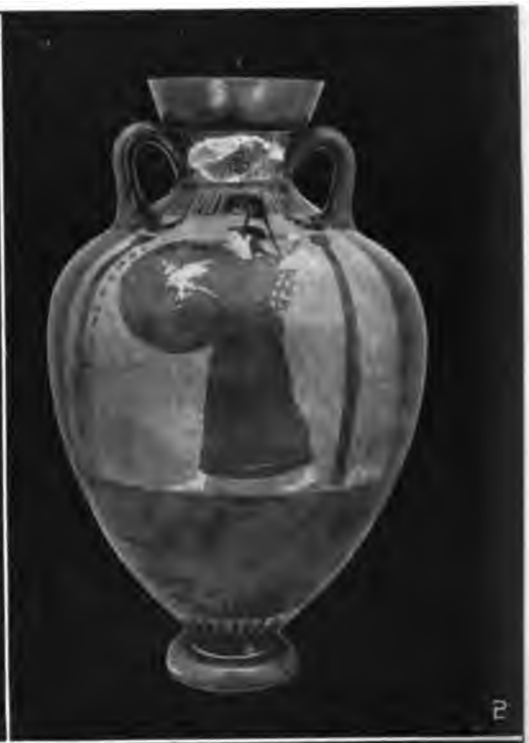
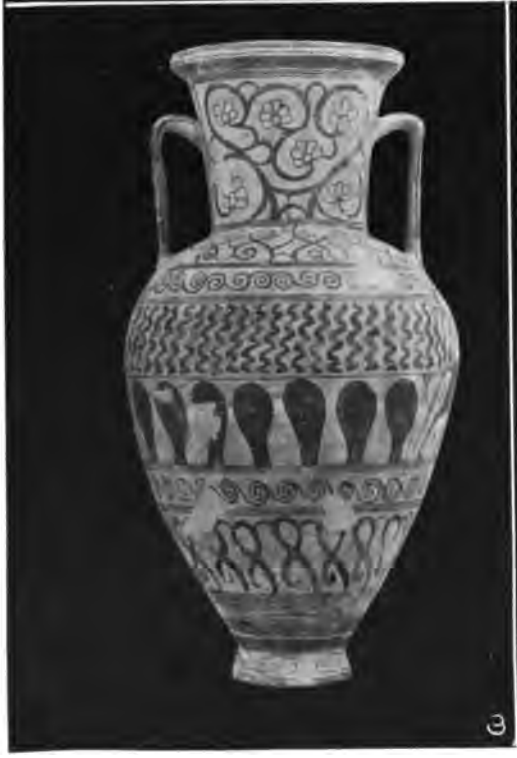
Courtesy of Metropolitan Museum of Art, New York

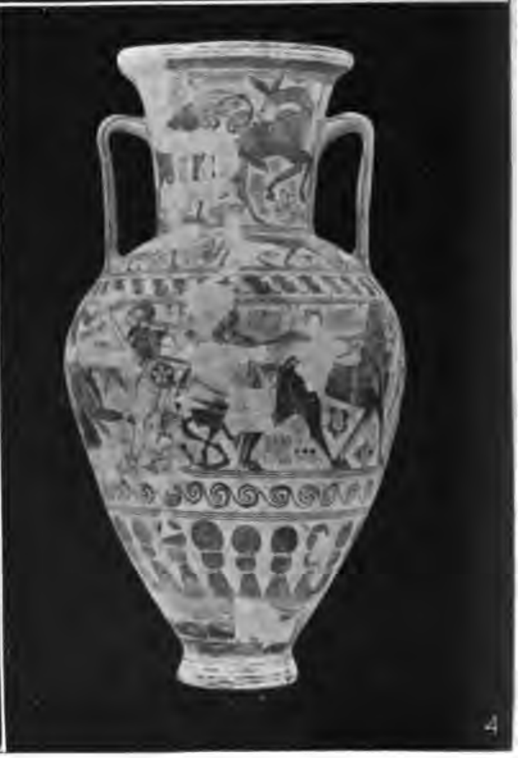
1 Black Figure Hydria. Heracles and Triton (350-300 B. C.)
2 White Figure Krater. Subject Dionysos and Satyr (600–500 B. C.)
3 White "Sepulchral" Lecythos (450–400 B. C.)
4 "Apulian" Vase. Subject Exchange of Gifts Between Lovers (4th Century B. C.)

GREEK VASES





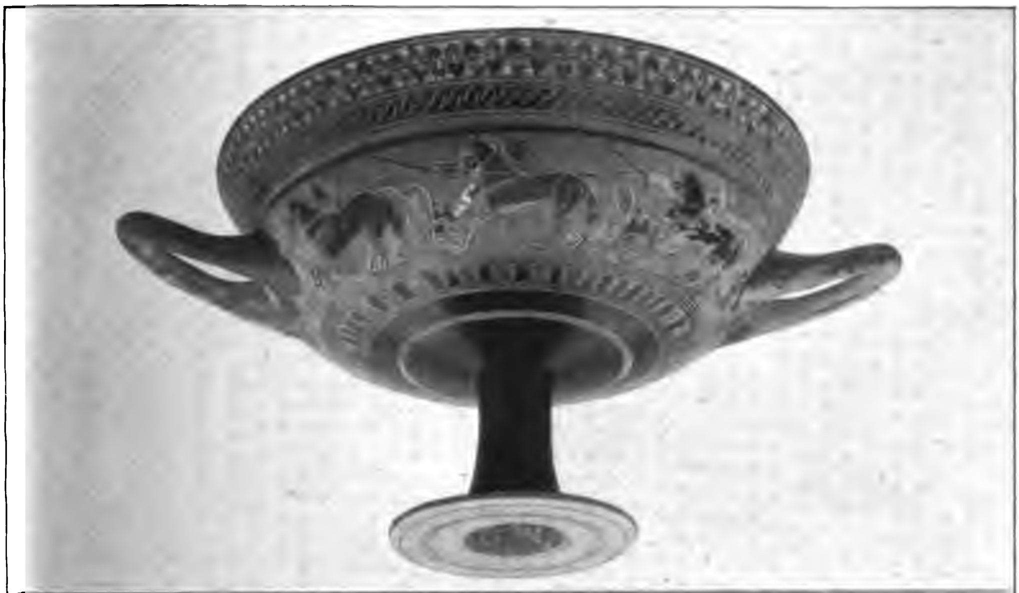


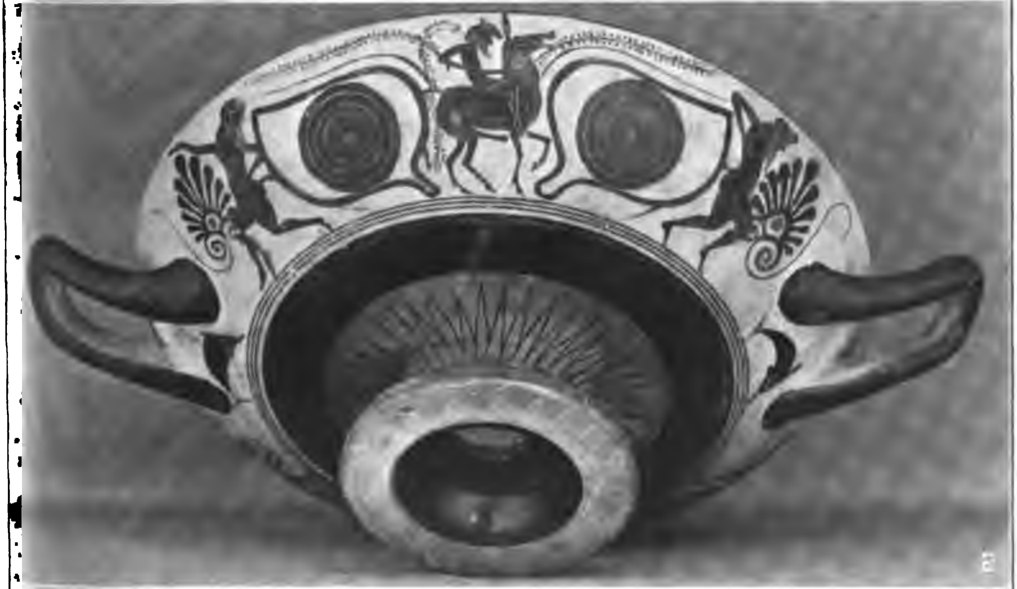


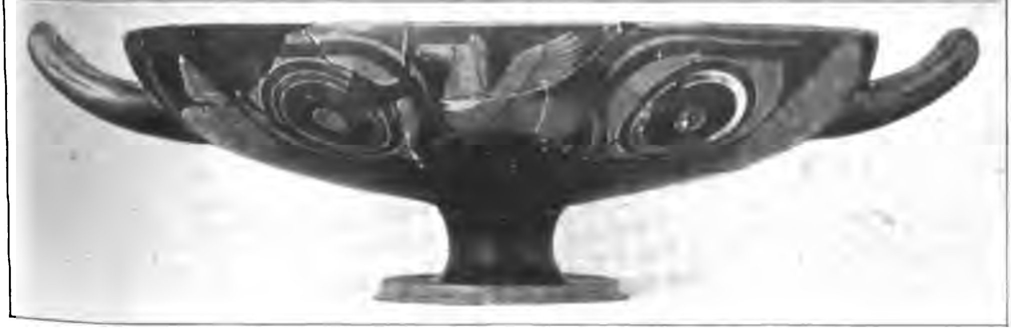
Courtesy of Metropolitan Museum of Art, New York

1 "Panathenaic" Amphora (520-500 B. C.) Contest, Side View
2 Same. Athene, Side View
3 Amphora. "Geometric" Decoration (7th Century B. C.)
4 Amphora. Late "Geometric" Decoration (7th Century B. C.)

GREEK VASES







Courtesy of Metropolitan Museum of Art, New York

1 Long-stemmed Kylix. Subject Chariot Race (6th Century B. C.)
2 Kylix. Subject Satyrs between Decorative Eyes (6th Century B. C.)
3 "Eye" Kylix. Signed "Psiax" (520–500 B. C.)

horses, dogs, etc. These pieces are said to date from 650 to 550 B.C. Their popularity soon died out with the competition of the artists of Athens.

ATTIC VASES.

Black Figure Period («Archaic» Style).— Until recent years all the black figure decorated pieces were considered of Attic production and were termed «Attic vases.» Later discoveries of the ware were made in Egypt (Naucratis), Rhodes, Cyrene, Corinth, thus disspelling the supposition of Attic monopoly. Copying the Corinthian methods, the Athenian artists soon excelled their prototypes and absorbed the entire export field. Amphoræ of the early stage have the designs in panels; favorite motifs are lotos, palmette, meander and rays, point upward, from the foot. The *chiton* (skirt) is depicted with rigid perpendicular folds; later the folds take oblique direction (to indicate motion). The *himation* (sort of shawl) started to be worn later and appears over the chiton on vases. Men's eyes are large and round, women's small and oval, they are not in side view but stare out entire from faces in profile. The human extremities taper in an archaic way; figures are unnaturally tall and thin. Perspective is missing. Very shallow kylikes decorated with eyes appear in this period. Many *Panathenaic* amphoræ (prize vases filled with oil given at the Panathenaic games) are black-figured; all have Athenē on the obverse brandishing a lance in her right hand, a shield in her left, the nude parts white. Columns on either side of her are surmounted usually by cocks. On the reverse side are scenes of the contests: foot-races, chariot-races, the pentathlon, boxing, musical competitions.

Dipylon Vases.— These are so called because most of these «geometric» decorated vases were found in the graveyard in front of the *dipylon* gate. Their ornament (called «geometric») consists of circles, crosses, lines, dots, with beautiful meanders interspersed. Later aquatic birds, deer and horses appear. The human form is attempted with archaic thin waists, angular shoulders, fork-formed legs.

Red Figure Period.— Termed often the «Beautiful» Style. Attic vases do not show black figures after about 400 B.C. The decoration and background then reverse one another and the body is painted in black varnish while the decoration is left in *reserve*, thus appearing in the red of the terra-cotta body. Details on the figures, which before had been indicated in white or purple, or by scratching lines disclosing the body, are done now by fine brush lines in black to bright yellow. The method gained in perfection from about 520 to 450 B.C. The kylix was the first vessel to obtain this new style ornamentation and we find hydriæ and amphoræ at that early stage still with black figures. Both methods in combination appear on some pieces of the transition period. The hair on human figures, before given a black mass, now is first done by engraving through the black, later by a thin line in *reserve*. The delineation of the eye changes in this red-figure period. Formerly the eye was given a full-faced detail, with circular pupil, on a face in profile; by stages the pupil and upper and lower lids assume the normal profile aspect. The later stage belongs to what has been termed the «strong» style, as distinguished from the former «severe» style. A further advance in depiction, early in the 5th century, is in displacing the stiff parallel folds of the chiton by waving folds that express the motion of the limbs and, in the artist Euphronios' day, the softness or pliability of the clothing is artistically expressed by indicating the form beneath by the direction of the folds of the drapery. The treatment of the human figure prevailing up to this period was taken from the Egyptian artists, and portrayed the shoulders and chest in front view while the rest of the figure was treated in profile. Perspective and foreshortening are arrived at in this period. It is the beginning of the «good» period.

We have, therefore, three stages of development in this «red figure» period. First, the «archaic» period with its Oriental and Egyptian tendencies and somewhat crude depiction but adept draughtsmanship; next, the «severe» period with its human figures in stiffly drawn clothing and disproportioned features; lastly, the commencement of art refinement in drawing and technique, as displayed in the «good» period. The «beautiful» style was in its greatest perfection about 450 B.C.

With the acquisition of absolute control and unexampled dexterity in both technique and draughtsmanship, comes soon a tendency to ultra-refinement and over-elaboration of ornament lacking the former repose and gracefulness; the treatment becomes «florid.» Composition became careless, even coarse. In 413 B.C. the Athenians were beaten in battle at Syracuse, in 404 Athens was captured by the Persians. At some time between 427 and 405 the production of Attic vases died out. We have Panathenaic amphoræ dated from 376 to 313 B.C., and that white sepulchral lecythi were being produced in 392 we know, for Aristophanes mentions the fact. But excavations at Athens disclose no painted vases in the tombs dating from early 6th century to 300 B.C.

The names of these wonderful potter artists that have come down to us are very few and there is doubt as to whether some of the names appearing on the vases are signatures; they may often be the names of original owners of the art pieces. From the fact of frequent appearance on pieces showing the same craftsmanship or other knowledge gained we get such names as Exekias and Nicosthenes (kylix painters); Andokides and Epictetos (transition black to red figure periods); Euphronios, Brygos, Euthymides (5th century); Charinos (red figure period); Hieron (cup painter); Duris, etc.

SOUTH-ITALIAN VASES.

Decadent Period.—After the 4th century many potter-artists appear to have deserted Athens and migrated to Greek colonies in the Crimea and South Italy (Capua, Tarentum, Pæstum, etc.). Their Attic refinement disappears, but the red-figure technique continues in this Greco-Italian ware. The aim is at vulgar display rather than art merit, probably catering to the tastes of their new patrons. Crowding of motifs (palmettes, wreaths, etc.), extended use of white in the flesh of females and the ever-present god Eros show decadence. Yellow appears for hair detail and for features and as shading; purple appears. The backs of the vases are either devoid of ornament or the work is done in careless, perfunctory manner. Some authorities suggest theatrical influence in the extravagance of posture and rich embroidering of the garments, etc. And stage scenes (tragedy and comedy) are depicted, even the stage itself is sometimes presented. But scenes of local daily occurrence are the most frequent. Some of the more ambitious large vases were, doubtless, designed for funeral use. They are decorated with pictures of action in the Under-World — groups containing Pluto and Persephone, Cerberus, the Furies, etc.; some show tombs or shrines and mourners making offerings to the dead. We find localities of provenance can be identified often by distinctive characteristics. Campania appears to have had a «fondness for polychromy» but the execution is careless; the artists in Apulia created some gigantic vases with very ornate handles for funerals and theatricals with ornament of great magnificence. At Pæstum were the artists Assteas and Python with their elaborately detailed groups depicting mythological scenes, etc., in true Attic style. By the end of the 3d century Grecian tendency gives way to Roman styles.

ETRUSCAN VASES.

Early Italian Pottery.— In this period title authorities include wares dating from 1000 B.C. to 400 B.C., and Walters (British Museum) divides it into the Villanova and Latium Periods and the Etruscan bucchero and Polledrara wares. The «Villanova Period» pieces are cinerary urns of the 10th century B.C. They are produced in «rough brown *impasto*» or coarsely prepared clay. Simple lines and curves constitute their decoration; they are found enclosed in bronze vases of elaborate decoration. Villanova (near Bologna) cemeteries disclosed the best specimens. Date of origin is still a matter of conjecture. Early «Latium Period» pottery vases are similar to the former ware in form and body and show thin polished paste. Advance in culture (about 700 B.C.) brought inhumation in place of incinerating of the deceased and imported Greek products are found in the tombs. Improved technique is shown on some native pieces and decoration changes from coarsely incised «geometrical» to carefully executed spirals, fan patterns, etc., defined in closely arranged punctures. Some red polished pieces belong to this ware which have crude designs (some painted in white); there are large «caldrons with high mounted stands» and triangularly pierced bases. «Etruscan bucchero» ware of the 8th century shows well-developed forms made in carefully refined and manipulated ceramic clay. Decoration is incised or engraved and moulded medallions and figure reliefs are applied. Some figures are moulded in the round and attached to the rims; some are caryatid forms acting as supports for the vases. This ware has lustrous black polished surface. Some red pieces are supposed to be an under-baked variety of the above but often show no decoration. Both the red and the black sometimes show friezes with bands of relief done by rolling a cylinder having decoration carved in intaglio. A form frequently found is a bowl with straight sides on a high support. «Polledrara» ware (so called from the place where a large hydria of this style was found) is placed in the 7th century B.C. These pieces are of reddish brown clay coated with lustrous black slip. They show elaborate painted decoration in yellowish white, blue and red.

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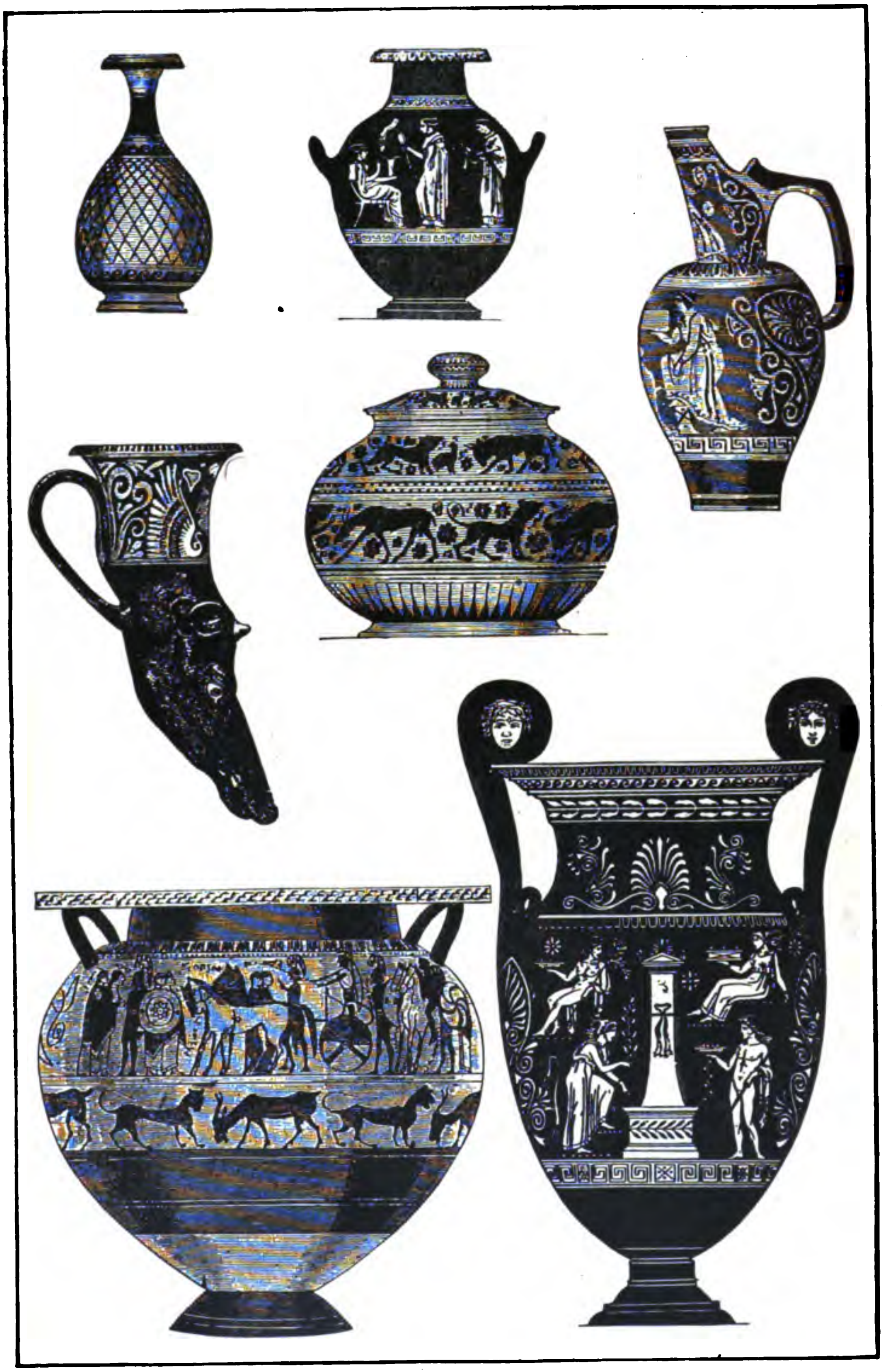
GREEK FESTIVALS. Festivals were a great feature of ancient Grecian life. There were country festivities in Attica in December, a feast of the wine-press in January, an «All-Souls» festival lasting three days in February, a great «City Festival» of Dionysus for five days in March, a festival of first-fruits in May, and the magnificent holiday of Athena for six days in the July of every fourth year. At Sparta the greatest festival was the Carneia. Then there were the great national festivals of Pan-Hellenic interest: at Olympia held in honor of Zeus every four years in Elis; the Pythia, in honor of Apollo at Crissa near Delphi, also



GREEK VASES

every fourth year; the Nemea in Argos every two years; and the Isthmia in honor of Poseidon every two years at Corinth. Musical contests were the chief feature at the Pythia, although athletic events were also held here as elsewhere. This festival was celebrated in the winter in the third year of every Olympiad. The Nemea were held in the second and fourth years of every Olympiad, alternately in summer and winter. Here also contests in playing the flute and the lyre and in singing were included. The Isthmia were held in the spring of the first and in the summer of the third year of every Olympiad. The visitors brought their slaves, who carried tents, bedding and food. Women were not permitted to attend; and even the slaves who accompanied their masters could not see the games. The earliest contest, and the one with which each festival opened, was the *stadion*, or short-distance foot-race, corresponding roughly to our 220 yard dash (to be exact 600 Greek feet). Wrestling and boxing were added later. In the 7th century chariot racing was introduced, and this was followed by the horse-race and the *pankration*, which required the use of all the powers of the contestants. The *pentathlon* (five events) had been introduced earlier. The prize at Olympia was a crown of wild olive; at the Pythia a wreath of laurel; at the Nemea and the Isthmia a wreath of parsley. See Olympic Games.

In Attica there were many Holy Days and Feasts: in August–September the Kronia, which was originally a rural festival, the Synoikia in honor of Athena and Hestia, the Panathenaea, the Heracleia, and the Adonia, celebrated especially by women; in September–October the Genesia, a day devoted to the dead, Charisteria, or Thanksgiving for the fall of the Thirty Tyrants; in October–November the Pyanepsia, or Feast of Beans, the Oschophoria (Grape-bearing race), the Theseia, the Epitaphia, the Apaturia, at which the babies and the young men were registered in the phratry, or clan, the Thesmophoria, celebrated by women in honor of Demeter, the Stenia, the Nesteia (a strict fast), and the Kalligeneia, the festival of the mother of the beautiful child (Persephone); in November–December the rural Dionysia and the Haloia; in December-January the Lenæa; in January–February the Anthesteria, or merry Feast of Flowers, the Opening of the Wine-casks, the Feast of Pitchers, the Feast of Pots, the Lesser Mysteries, and the Diasia; in February-March the Greater Dionysia, the chief feature of which was the dramatic contests; in March–April the Mounichia, the Aianteia in memory of Ajax, the Brausonia and the Olympieia; in April–May the Thargelia, the Delia, the Kallynteria, at which the little temple, Erechtheum, was purified, and the Bendideia in honor of the Thracian goddess Bendis; and in May–June the Skira, the Arrephoria and the Dipolia.

The Panathenæa included contests in athletics, music and in literary recitation. In the large Mouseion, or «Hall of Song,» was held a public competition in the delivery of passages of Homer, another in signing to the accompaniment of the harp, and a third in instrumental music on the harp and the flute. The rewards were prizes in money and a wreath or crown. On another day was an all-night festivity of song and dance and of torch-races.

The chief day, however, was the day of the great procession. All the people gathered in their most brilliant attire in the Cerameicus for the purpose of escorting to the Acropolis a large and gorgeous saffron robe, embroidered with legendary exploits of Athena against the Giants. It was spread as a sail upon the mast of the model of a ship, which was propelled along the street on wheels, or rollers. The cavalry in their bright cloaks led the procession; the winners in the athletic contests, wearing their crowns and the dignitaries and old men of high repute carrying olive branches, came next; and the women of the resident aliens, carrying the parasols and the camp-stools of the privileged daughters of Athens, brought up the rear. The procession moved through the public square, wound through the chief streets to the foot of the Acropolis, ascended through the Propylaea, and passed on to the older temple, in front of which a great sacrifice was made. A feast followed, and the whole festival closed with a regatta at the harbor-town of Peiraeus. (For the Dionysiac festival see Greek Theatre, The; for the Olympic festival see Olympic Games). Consult Gulick, ‹The Life of the Ancient Greeks› (New York 1902); Mommsen, ‹Die Fest der Stadt Athen im Alterthum› (Leipzig 1898); Tucker, ‹Life in Ancient Athens› (New York 1906).

Joseph E. Harry.

GREEK FIRE, a combustible composition made probably of naphtha, sulphur and nitre, which was first used in 673 A.D. by the Greeks of the Byzantine Empire against the Saracens. Its invention has usually been ascribed to Callinicus of Heliopolis, and to the year 668 A.D. The mixture appears to have been highly inflammable, and to have been difficult to extinguish; was poured out, burning, from ladles on besiegers, projected out of tubes to a distance, or shot from balistæ, burning on tow tied to arrows. At Constantinople the process of making Greek fire was kept a secret for several centuries; but the knowledge of its composition and the use of it, gradually spread to the West. It was in use for a short time after the invention of gunpowder. Combustibles of a similar kind were used at the siege of Charleston in 1863, composed of sulphur, nitre and lampblack; and naphtha in shells was also tried.

GREEK GODS, The. Until within the last half century our earliest knowledge of the gods of Greece was obtained from the Homeric poems, but the excavations which were inaugurated at Troy by Schliemann in 1871, and continued by him and many others at Mycenæ and at numerous other sites in Greece proper, and which more recently have been prosecuted in Crete and on the western coast of Asia Minor, have revealed to us many monuments of the second and some even of the third millenium before our era. These monuments show us that in the second millenium, B.C., the inhabitants of these lands had already conceived of some at least of their divinities in anthropomorphic forms; that is to say, they thought of their gods and represented them in the fashion of human beings, so that when the Hellenic civilization of the later period developed, the people were in many ways in an advanced religious stage.

On the other hand there survived among the ancient Greeks to the latest period many primitive elements, such as the worship of sacred stones, trees, symbols, etc. The monuments of the Minoan and Mycenean civilizations seem to give evidence of widespread animal worship and of the cult of monsters, part man and part beast. This worship survived in part into the historic period; probably some of the sacred animals of later times bear witness to it; even in the 5th century, the god Dionysus was celebrated in song as a divine bull. In agricultural festivals also many primitive rites survived, such as the widespread phallos worship. Therefore Greek religion of the classical period and through all the centuries to the end of antiquity contained much that belongs to the lower strata of religious development side by side with higher concepts of divinity.

The Origin of the Gods.— As to the origin of the Greek gods, it is impossible to speak with certainty on many points. Without question the worship of natural phenomena, of inanimate objects, of ancestors, and of sacred animals and trees all contributed to make up the sum total, but this list does not exhaust all the factors which entered into Greek religious thought and expression. To the Greek the world was filled with a multitude of superhuman beings who were responsible for all phenomena. Most of these divinities were limited and local, but since some were manifested in every field of activity, man was always in social relations to them; he was obliged to seek their favor, or to propitiate them by offerings and by prayer. A few gods among the total attained to a universal character, so that they were worshiped in every part of the Greek world; but, even so, most of these gods had seats to which their worship was especially attached, as Athena to Athens, or Hera to Argos.

Their Character and Power.— In the ‘Iliad’ and ‘Odyssey’ we find a group of gods bound together in an organization similar to that of the Homeric state. At the head is Zeus, the father of gods and of men, whose power far surpasses that of any other divinity, but who, however, is not wholly omnipotent or omniscient. To him the elements are subject and his nod makes the universe tremble. He is the chief of all: he presides over his aristocratic state like a Homeric king, while the other Olympian divinities make up the council, and the minor gods form the popular assembly. With him Apollo and Athena hold the first rank. Hera, the sister and wife of Zeus, however, belongs in the second with Poseidon, the god of the sea. Ares and Aphrodite represent the two passions of rage in battle and of sexual love. Artemis, the sister of Apollo, is of lower rank, as is Hephæstus, the god of fire. Hermes is a kind of upper servant of the great gods, who executes their commissions; there are still other divinities of inferior position.

Demeter and Dionysus, who are so important in later centuries, have not yet been admitted to Olympus in the Homeric epics. The god of the lower world is Hades; he presides in the realm of the dead, which is conceived to be beneath the earth.

All these divinities are represented as stronger, larger, and wiser than mortals; but not wholly superior to them, for like them they are subject to the passions of the mind and body. Their pre-eminence over mortals consists chiefly in their immortality. This Homeric pantheon seems to have been created in part by a selection, made from the greater local divinities, who were universalized by the poet and given the characters which his art fixed for all later time. The Homeric poems acquired such universal influence wherever Greeks went, that the chief local divinity was assimilated to one of the Homeric gods and given the characteristics which that divinity possesses in the epics. At Olympia Phidias fashioned his Zeus after the Homeric description, and at Athens he represented Athena in the manner in which the epic bard had made her.

These great epics then represented the gods, in a sense, in an artificial organization. Hesiod, however, introduces us to a somewhat different world and to conditions as they really existed. We find in him many divinities not mentioned in Homer; and the worship of the dead and of heroes, which the epic poet passed over, is made much of by the later writer.

It is evident that Zeus was, from an unknown period, the most universal of the Greek gods. The superior position which he occupies in Homer was still further exalted, until he became altogether supreme, and even appears as the all-embracing divinity including all minor gods, comprehending within himself all divine powers. Indeed at times the Greeks approached monotheism. Yet it is necessary to bear in mind that to the ordinary Greek his local gods were most important, and although he might recognize a similarity between his divinity and the same divinity in some other place, his attitude remained very much like that of the Greek peasant to-day toward his local saint.

The greater gods like Zeus and Athena doubtless absorbed countless numbers of local divinities, and yet even these gods retained in a way their local habitations to the end of paganism. Olympus was the home of Zeus above all other places. The Athenians, at least, regarded Athens as the home of Athena, while Hera was domiciled in Argos from unknown antiquity. Apollo had two homes, at Delphi and at Delos; the former was his chief oracular center from which for centuries his pronouncements, as interpreted by his priests, influenced affairs to the remotest borders of the Greek world; at Delos the god presided over the ancient religious centre of the Ægean. Asclepios had his great home at Epidaurus in Argolis. To this place for centuries the sick and cripples came to be healed by a vision or a miracle, and in later times by regular therapeutic treatment. A branch was established on the island of Cos, and early in the 3d century the Romans induced the god to begin the practice of his art on the island in the Tiber.

At Eleusis, northwest of Athens, there was celebrated at an early period an agricultural festival in honor of Demeter and her daughter. Out of these agricultural rites, intended to secure abundant crops through the favor of the goddesses, arose the Eleusian mysteries in which the initiates received assurance of a happy life hereafter. Similar mysteries, presided over by these two divinities, or by others, existed in many parts of Greece, but none attained to the importance of those at Eleusis.

The heroes formed a class of superhuman beings midway between mortals and the gods, often half-divine by origin; they received celestial honors after death. The most famous of these were Hercules and Theseus, both of whom undertook severe toils for the advantage of mortals and so conferred lasting benefit on mankind, in return for which they received divinity.

In the Minoan and Mycenean periods it is clear that the spirits of the dead were worshipped or propitiated by offerings at the tombs; these practices were universal in later Greece. Gifts of wine, milk, and honey were regularly made, and the nearest of kin celebrated anniversary meals in honor of the deceased. In general the spirits of the dead were regarded as baneful powers rather than beneficient divinities.

With the rise and development of philosophic thought the enlightened Greeks greatly modified their belief in the gods of the common people, so that in Plato we find something very akin to monotheism. Later philosophies, like the Stoic, provided for a multitude of gods, although they asserted the supremacy and all-comprehensive character of the divine principle, so that under the Roman Empire the educated part of the ancient world held to a henotheistic view, which, however, did not exclude an elaborate polytheism; that is to say, they believed that the divine was one, but that it manifested itself in countless ways and in countless places, and that for convenience it was allowable to give to these various manifestations of the One the names of the many gods of popular belief. Such views, however, were limited to the more highly educated, for common men continued to believe in a vast number of individual divinities throughout antiquity, and indeed brought this belief over into Christianity. See GREEK MYTHOLOGY; GREEK RELIGION.

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GREEK LANGUAGE. Greek is one of the Indo-European languages, and in its modern form which illustrates fully the analytic tendency of all modern languages, it is still spoken by 8 or 10,000,000 Greeks, who inhabit nearly the same regions as in ancient times. These included the southern part of the Balkan peninsula, i.e., Greece proper, with Epirus and parts of Macedonia, the eastern shores of the Ægean Sea with all its islands, extensive colonies on the coasts of the Propontis and Black Sea, the large islands Crete and Cyprus, settlements, like that of Cyrene, on the northern coast of Africa, colonies in southern Italy and Sicily which controlled these regions so fully that the name Magna Græcia clung to them until long after they came to form parts of the Roman empire. Only in the western Mediterranean has there been any marked decrease, and this chiefly in mediæval and modern times, in the numbers of Greek-speaking inhabitants. The earliest home of the Greeks, the region in which, as far as we can tell, their speech first developed a character of its own, seems to have been in the great plains of the Danube, or among the mountains of the Balkan ranges. The homogeneity of the language in sounds, forms and vocabulary is indicative of a considerable lapse of time between the period of breaking off from the parent Aryan or Indo-European stock, and the later splitting up, in successive waves of immigration, into the various small and separate states of Greece with their individual dialectic peculiarities. These states were in early times so cut off from one another that a common language could hardly have developed among them at that early period. Rather did their mountainous barriers and the difficulties and dangers of early navigation tend to develop groups that differed from each other in dialect and in race consciousness.

Ancient Greek.— Numerous inscriptions of the 7th century B.C., written chiefly in an alphabet derived from Semitic sources, are the earliest testimony that we have as to the form of the language after it had reached this dialect stage, but references in the early literature show that the Greeks were preceded in their land by various peoples of, as far as we know, autochthonous Mediterranean stock, who spoke a non-Indo-European language. Such were the Pelasgi, scattered over many parts of Greece, the Leleges in central Greece and the Cyclades, and the Carians in southwest Asia Minor and the neighboring islands. These peoples were gradually absorbed by the invading Greeks, but undoubtedly influenced the language of their conquerors to a greater or less extent. Proper names ending in -ettos, -issos, -ossos and -inthos, such as Hymettos, Lycabettos, Cephissos, Gnossos, Corinthos, Parnassos and Parnes, which seem to have no meaning as Greek words, and have no cognates in the other Indo-European languages, are probably survivals from the speech of these older inhabitants. It is truly remarkable and confirmatory to a high degree of our faith in inherited legends, that the mythical tales of racial wanderings and settlements, handed down by the Greeks in their legends agree so fully with the evidence derived from linguistic sources. Tribes and cities far removed in space retain in their speech traces of their early consanguinity. The first wave from the north that swept into Greece made its way into Attica and Eubœa, the northeastern part of the Peloponnesus and its northern or (later) Achæan coast. Probably under the pressure of a later wave of immigrants, the most venturesome and daring among them, seemingly chiefly men, made their way by the Cyclades islands to the central part of western Asia Minor, where, by contact with the Carian civilization and intermarriage with the women of the land, that distinctively Ionic dialect and culture arose, which differed so markedly from the Attic-Ionic type. We find a fairly uniform speech in Miletus, Priene, Ephesus, Chios and Samos, in the cities of the Ionian Dodecapolis, the Cyclades and Eubœa, and in the colonies founded from Miletus before the 7th century B.C. The Ionians seem to have borrowed epic poetry from their northern Greek neighbors, the Æolians, whose southern colonies they subdued in the 9th century B.C. In the Iliad and the Odyssey they added a realistic and finely descriptive element to the imaginative, vigorously creative gift of the early Æolian rhapsodists. From Chalcis as well as from Miletus this Ionicizing influence spread to Chalcidice, Thrace and the Black Sea, to Italy and Sicily, where it was, however, finally forced to yield ground in the 5th century to the Doric. Ionic changed least in the Cyclades and Eubœa, where its isolated condition tended to preserve it, and changed most in Athens where a variety of influences were brought to bear on it.

A full discussion of the Ionic dialect would be out of place here, but the following important characteristics may be listed: (1) The ᾱ of the original common Greek becomes η in Ionic (δᾶμος to δῆμος, μάτηρ to μήτηρ) although in the Attic form of this dialect ᾱ is found after ε, ι, and ρ. In the earliest Attic Greek, however, even in these cases we have every reason to believe that the Ionic η prevailed for a considerable time until the influence of the surrounding mainland dialects caused ᾱ to be pronounced; (2) A metathesis of quantity is observed in words like βασιλῆος and the Ionic βασιλέως. So λαός to λεώς and the genitive τιμάων to τιμέων, or by synizesis to the dissyllabic τιμεῶν, τιμῶν; (3) Two vowels in the interior of a word were very early contracted: τιμάεις, to τιμᾷς, φιλέω to φιλῶ, γένεος to γένους, etc: (4) The letter F, long preserved in the other dialects in words like Fέργον, Fοῖκος, and Fοῖδα, disappeared very early in Ionic (800 B.C. or earlier) though the Iliad and Odyssey show clear traces of its use at the time the poems were composed; (5) Instead of an original ὑμές, ὑμέων, and ὑμέ, etc., the Ionic uses the forms ὑμεῖς, ὑμῶν and ὑμᾶς, on the analogy of adjectives like ἀληθής; (6) ν movable seems to have come in on the analogy of ἦν (cf. Homeric ἦεν, where the ν is an original third person plural ending extended to the singular); (7) The infinitive ending -ναι was an Ionic late formation; (8) The Ionic ἄν, perhaps corresponding to the Gothic interrogative particle AN replaces κέ or κέν of the older Greek; (9) πρός instead of ποτί and εἰ for αἰ and ἤ were also characteristic of this dialect.

In the Attic form of the Ionic εο, ε was assimilated to the following O-sound and the vowels were then contracted to ου, whereas, in other Ionic, εο was contracted to ευ. The use of ττ for σσ was a second peculiarity of the Attic-Ionic (θάλαττα for θάλασσα, πράττω for πράσσω), and the change of υ into ü first made its appearance in this dialect. The common Ionic shares with the Æolic the early loss of the rough breathing.

A contemporary or slightly later wave of immigrants whom we may call Achæans, settled first in the plain of Thessaly and the adjacent regions to the south. Colonists from here, the Argeioi, the Danaoi, and the Achæoi of Homer, crossed the northern Ægean and settled in the northwest or Æolian part of Asia Minor, where they developed the Greek epic. The heroes of the Iliad, the great gôd Zeus, geographical names like Æolis and Olympos, seem to have been transplanted, along with the Achæan or Æolic language, to the new Asiatic abode. In their first home in Greece proper these invaders learned much from the more civilized inhabitants by whose wealth in gold, in raiment, and in cattle they had been originally attracted and their language too, as we might expect, was greatly enriched from this contact. Homer's word ασάμενθος, a bath-tub, with its Pelasgic termination (cf. Corinthos), proves the adoption by the conquerors of the custom of hot-water bathing, complicated arrangements for which have been found in the splendid pre-Greek palaces excavated during the last few decades in Gnossos and Phaestos in Crete. The simple houses of these Achæan Greeks had been in older times constructed of wood and clay (δόμος, a house, τοῖχος a mud wall), by builders called τέκτονες. They now learned to use the massive Cyclopean masonry of the natives, and built for themselves, using the indigenous names, houses of many chambers, θάλαμοι (for the termination cf. the pre-Greek name Πέργαμος) with a men's living room, μέγαρον (cf. the Asiatic word Μέγαρα). Fortresses, πύργοι (cf. word Πέργαμος), towers for defense, τύρσεις (cf. Τυρσηνοί, Etrurians, the robber barons who built their forts on the Mediterranean coasts against the natives whom they pillaged), and ναFοί, permanent temples of the gods, were now for the first time built by these rude Greeks and along with the new thing they learned to use the native name. Almost the only one of the old Indo-European divinities that survives is Ζεὺς πατήρ. Ἠώς, the daughter of Zeus, Ušās duhita Divas, of the Sanscrit, surrenders her divine birthright to Athana, a local divinity (cf. the pre-Greek names Μυκᾶναι and Πιράνα, the fountain-goddess Pirene in Corinth). Among more general influences the change of the common-Greek ᾱ to η in the Attic-Ionic may have been due to Pelasgian influence, as also that of τι to σι in δίδωσι and τριακόσιοι, τριακάτιοι (cf. ἑκατόν). The old view that Semitic influence played a large part in the formation of the Greek language has now been given up, for apart from a few words that were imported with the objects that they named, e.g., χιτών, a tunic, a linguistic phenomenon that we can parallel in such English words as caoutchouc and chicle, this influence was limited to names of characters in story and myth that wandered in with the tales themselves.

The names Αἰολίς and Αἰολεῖς are unknown to Homer and seem to have been brought by later immigrants from inland Thessaly (cf. Herod., VII, 176). The dialect remains of Thessaly agree fully with the dialect of Alcaeus and Sappho. Achæa, the northern district of the Peloponnesus was settled at about the time of the fall of Troy and a mixture of the Ionic and Æolic dialects resulted. Into the southern part of Arcadia, Elis and some other parts of the Peloponnesus, the Æolians penetrated carrying with them names like Agamemnon and Menelaos. Thus is probably to be explained the fact that the Epic poets regarded these heroes as indigenous in Southern Greece. Everywhere except in the mountains of Arcadia and in the sacred region of the Olympian Zeus in Elis the Æolians were forced toward the end of this second millennuim B.C. to yield to the Dorians who swarmed down from the mountainous region west and northwest of Thessaly, gradually driving the Achæans before them. In Crete, too, which the Achæans had invaded, the Dorians later gained the upper hand and imposed their dialect. Only in the central part of Crete do we find in words like *ὄνυμα* and the article *οἱ*, in the prepositions *ἰν* and *πεδά*, traces of the old Achæan dialect. In Cyprus, however, the dialect inscriptions show this Achæan character more clearly persisting, though the alphabet in which they are written is entirely different from any Greek alphabet of which we know. We have then the Æolic of Middle Thessaly, that of Asia Minor, that of Bœotia, where it was strongly tinged with Doric, that of Arcadia and that of Cyprus. Common to these are the following peculiarities: (1) The change of common Greek *αρ*, *ρα* into *ορ*, *ρο*: *στροτός* from *στρατός*, *βροχύς* from *βραχύς*; (2) *ὀν* for *ἀνά*: *ὀνέθηκε* for *ἀνέθηκε*; (3) *δέκο*, *δέκοτος*, *ἑκοτόν* for *δέκα*, *δέκατος*, *ἑκατόν*; (4) *ἀπύ* for *ἀπό*; (5) *πείσω*, *πεῖσαι* for *τιίσω*, *τεῖσαι*; *ἀππεῖσαι*=*ἀποτεῖσαι*; (6) The words *κυμερνάτας* for *κυβερνήτης*, *πτόλις* for *πόλις*; *δαύχνα* for *δάφνα*; (7) The contract verbs in *-έω*, *-άω* and *όω* appear as *-μι* verbs; (8) Endings *-ην* and *-θην* form infinitives of the aorist passive; (9) The demonstrative pronouns *ὄνε* and *ὄνι* (*ὄνυ* in Arcadian and Cyprian); (10) The particle *κέ* (Doric *κά*, Ionic *ἄν*); (11) *πεδά* for *μετά* of the Ionic and Doric. In the three northern dialects we find double nasals and liquids arising out of *-σμ-*, *-σν-*, *-νσ-*, *-λσ-*, etc. *ἔμμι*, *στέλλαι*, etc., the dative ending *-εσσι*, a perfect participle in *-ων* (*γεγόνων*, *γεγονοντος*) and perhaps *γίνυμαι* for *γίγνομαι*. In the two southern dialects we find *σις* for *τις*, a genitive in *-αυ* for the masculines of the first declension, *ὄνυ* for *ὅδε* (see above), an infinitive in *-εν* (*φέρεν*), *ἰν* for *ἐν*, *πος* for *ποτί*, *κάς* for *καί* and *-κρέτης* in proper names for *-κράτης* The latter group we may assume came from the Spercheios valley, while the former was originally settled in the Peneios valley in Thessaly. Toward the end of the second millennium B.C., from their mountain fastnesses in northern Epirus, Illyria and upper Macedonia the Dorians began to spread out toward the east and south into Thessaly and the rest of Greece. From the tribe which was chiefly instrumental in subduing the Peloponnesus the Greeks gave the name Dorian to the whole group of invaders whose speech, as Heinrich Ludolf Ahrens ('De dialecto Dorica,' 1843) recognized, is closely related to the dialects of Epirus, Acarnania, Ætolia, Locris, Phocis and Delphi. The Bœotians (the name comes from the mountain *Βοῖον* in northern Epirus) came into Thessaly first, and then driven on by the Thesprotian Thessalians at their heels (cf. Herod., VII, 176), they came into Phocis and Bœotia, where mingling with Achæan Æolians, they formed the Bœotians of historic times. The later Dorian hordes settled on the northern shores of the Corinthian Gulf and then by way of Naupactus passed over into Peloponnesus. Herodotus (VIII, 73) tells us that of the seven peoples of Peloponnesus, three — the Arcadians, the Ionians of Cynuria and the Achæans — were autochthonous, while the Lemnians in Triphylia, the Dryopians in the Argolid and the Dorians and Æolians were invaders. In Elis we find certain Æolian-Locrian peculiarities of speech, a third declension dative ending in *-οις* (*παίδοις*, *φερόντοις*), an open pronunciation of *ε* as *α* before *ρ* (cf. the English clerk as "clark") which justify us in distinguishing a west and an east Doric. Ahrens' distinction of a *Doris severior* and a *Doris mitior* later philologists tend to explain as a chronological breaking down of the older, harsher Doric in contrast with the other dialects. In the former, spoken in Laconia, Tarentum, Heracleia, Crete and Cyrene the genitive singular ending of the second declension is *ω*, while *η* and *ω* are found in compensative lengthening *ἡμί* from *ἐσμί*, *ἵππως* from *ἵππους*, while elsewhere Attic-Ionic forms are found in these cases.

The Dorians like the Achæans held to the original *ᾱ* of the common Greek and to F; the endings *-τι* and *-ντι* remained unchanged, (*δίδωτι*, he gives; *φέροντι*, they bring); the article in the nominative plural has its Indo-European form *τοί* and *ταί*; the oldest form of the second personal pronoun *τύ* (Latin, tū; Sanskrit tū) was kept, and *τῆνος*, was used for *κεῖνος* or *κῆνος* (*ἐκεῖνος*); the older future, the so-called Doric future, (e.g. *φευξέομαι*) is also noteworthy; the ending in the first person plural *-μες* (cf. Latin *-mus*) is also a more original ending. Among innovations or new formations may be mentioned *κά* for *κέ* and *γά* for *γέ*; *πρᾶτος* (from *πρόατος*) for *πρῶτος*; the contractions of *ᾰ+ε*, *ᾰ+η*, in interior of words, to *η*; *βασιλέ*(F)*ος* for *βασιλέως*; *-άξαι* and *-ίξαι* in aorist infinitive endings for *-άσαι* and *-ίσαι* (*σκευάξαι*).

Extant Greek literature begins with the Homeric poems. These are, however, to be regarded as the culmination, about 1000 B.C., of several centuries of development in the metrical use first of Æolic and then of Ionic Greek. The Iliad and the Odyssey so completely dominated the imagination of the Greeks everywhere, becoming as it were their Holy Book, recording the beginnings of their race, that its influence, like that of King James' translation of the Bible, was exerted on all subsequent Greek literature. Particularly in the early centuries, not literature alone but the historical work of Herodotus and the medical treatises of an Hippocrates were written in Ionic Greek, because this was the first dialect to develop a literary form. In the homes of the tyrants of the islands of the Ægean the Æolian love poetry of Alcæus and Sappho arose in the 7th and 6th centuries B.C., and in this dialect with the natural conservatism of literature such poetry continued to be written. Later, in the 5th and 4th centuries B.C., the pre-eminent greatness of Attic prose writers like Thucydides, Plato and Demosthenes and of poets like Æschylus, Sophocles, Euripides, Aristophanes and Menander gave Attic Greek a predominance that has always persisted. The solemn choral poetry of the Dorians, especially adopted to musical utterance by its broader Doric vocalization, and its quaint archaic forms, was used by Attic poets in the choruses of tragedy and by Stesichorus, Pindar and Simonides in those lyrics in which they chanted the praises of great athletes and kings. Through his vast military projects and undertakings Alexander the Great spread the Attic dialect in a modified form over all the world that he subdued, and it is from this dialect, corrupted not infrequently by the introduction of words and forms from other dialects, that the *κοινὴ διάλεκτος* or, as it is more commonly called, the *κοινή* arose. In this language the New Testament was written, and thousands upon thousands of papyri, contemporary with the New Testament, and discovered only in the last few decades, have contributed to give us a clear conception of this wide spread *lingua* *franca*, that was found wherever Greeks and Greek civilization penetrated. From this form of the language Modern Greek has been directly evolved. The scholars of the last century who imagined that they saw in the language of to-day full and clear traces of the Homeric Ionic or of the Æolic dialect were palpably and provably wrong. Only in the peculiar dialect of a few Zaconian villages of Sparta or in scattered words and phrases in Crete, Cyprus, Cappadocia or the coast towns of the Black Sea, do we find any traces and these the most meagre of the older Greek dialects. Before passing to a consideration of this modern form of the language, which is of special interest to Americans because of the recent growth in Greek immigration into the country, it remains to speak of some of the most important general characteristics of Attic Greek, the most highly developed form of the language. Into the relation of Greek with the other Indo-European languages from the point of view either of phonetics or vocabulary it is unnecessary to go deeply. (See the articles on GRIMM'S LAW, PHILOLOGY, SANSKRIT, etc.). Words like *πατήρ*, father; *μήτηρ*, mother; *θυγάτηρ*, daughter; *δύο*, two; *τρεῖς*, three; *ἕξ*, six, F*οῖνος*, wine; F*έργον*, work, show sufficiently that the basis of the language is the same as that of Celtic, Latin, German, Russian, etc. Greek had 24 letters, apart from an earlier digamma, F, (= w or v), koppa ϙ, akin to our q, and san ϻ, an s sound of some sort, which, except as numeral signs, had disappeared from the Attic Greek at an early period.

Α	α	alpha	Ν	ν	nu
Β	β	beta	Ξ	ξ	xi
Γ	γ	gamma	Ο	ο	omicron
Δ	δ	delta	Π	π	pi
Ε	ε	epsilon	Ρ	ρ	rho
Ζ	ζ	zeta	Σ	σς	sigma
Η	η	eta	Τ	τ	tau
Θ	θ	theta	Υ	υ	upsilon
Ι	ι	iota	Φ	φ	phi
Κ	κ	kappa	Χ	χ	chi
Λ	λ	lambda	Ψ	ψ	psi
Μ	μ	mu	Ω	ω	omega

These letters may be thus classified:

10 vowels, α ᾱ, ε η, ι ῑ, ο ω, υ ῡ

12 diphthongs αι, αυ, ει, ευ, οι, ου, ᾱι, ᾱυ, ηι, ηυ, ωι, ωυ, in which the two vowels must at first have had their original values, but coalescing under one expulsion of the breath, and therefore forming one syllable. These sounds were later modified in the dialects in different ways and in Modern Greek (by an increasing emphasis on the final vowel) ει, οι, υι, and ηι came to be pronounced like ι, while η and υ also came to have the same pronunciation.

Labial consonants π β φ.
Palatal consonants κ γ χ.
Lingual consonants τ δ θ.

These consonants, thus arranged in «classes,» by the place of their origin, as lip sounds, palatal (or guttural) sounds, or tongue and teeth sounds, may also be arranged in «orders,» π κ τ forming smooth or surd sounds, β γ δ forming sonants or voiced sounds, while φ χ θ were originally π κ τ plus an aspiration, like *ph* in uphill, *kh* in bake-house, and *th* in pot-hook. These sounds at an early date became the spirants f, ch (as in the German *lachen* or the Scotch *loch*), and the Anglo-Saxon and English *th*.

The spirants σ and ζ.
The liquids λ and ρ.
The nasals μ, ν and an n palatal (ñ) = ng.

Double consonants ξ = κ, γ or χ + σ and ψ = π, β or φ + σ (ζ a sonant or voiced spirant was originally a double consonant arising from δσ or σδ). For a more complete discussion of the Greek alphabet, its origin, its growth, the varying dialectic forms of the letters, the two Attic alphabets, see ALPHABET.

That fresh vigor which has always characterized the Greek mind, that vividness of sense conception that caused the Greeks at so early a period in their history to seek expression in art, architecture and music, could not fail to show itself in their language making it confessedly the most perfect vehicle for the expression of thought that has ever existed. At or near the beginning of sentences the Greek, by the use of some little particle, enclitic or post-positive, often showed the very mood of his mind, his pre-existent attitude, toward the thought that he was to utter. The written word thus speaks with the spontaneous vivacity that a Frenchman's shrug of shoulder or play of feature or bodily pose so vividly conveys. Distinctions so fine that they elude exact and idiomatic rendition except by oral translation, in which emphasis and shade of meaning may be communicated to the hearer by voice and facial expression, are by the use of particles like γε, τοι, περ, οὖν and δή set before the eyes of the reader in black and white. Another thing that contributes largely to the clearness and conciseness of the language is its richness in verb-forms. A middle voice expressed the warmth of personal interest or advantage in an act; the optative mood, missing in the Latin language, expressed future relations and desires a shade more vaguely and remotely than did the subjunctive or future indicative; in the subordinate moods and in the infinitive we find a clear distinction made between present and aorist, a distinction not of time, however, for these moods are naturally future (or, as in the case of the infinitive, devoid of any time idea whatsoever) but of the nature of the act as habitual or repeated, or as simply occurring once. Thus «He wishes to write good letters habitually» is expressed by the present infinitive, while «He wishes to write a good letter» is expressed by the aorist infinitive. «Honor thy father and thy mother» and «Bow down to Naaman» are respectively present and aorist imperatives. This distinction has been fully preserved in Modern Greek and is one of the most convincing proofs that the spirit of the ancient Greek language has never died. The existence of present, future, aorist and perfect infinitives and participles permits a nicety of expression that hardly any other language can equal. The fact that the infinitive, apart from the distinction above mentioned, which characterizes the nature of the action rather than its time, is an indeclinable neuter noun and can (especially when used with the article to denote its case) be used with surprising clearness as subject or object or predicate, in cognate or object relations with adjectives, verbs and prepositions, and absolutely in an accusative of specification construction, makes it one of the most flexible elements of the Greek language. The early discrimination of a definite article (here, too, we note the relative poverty of the Latin) from an original demonstrative pronoun greatly increased the usefulness of both infinitive and participle, for modifiers of the verb idea in both could be placed between article and noun in such a way as to show their relation most clearly. This gave a definiteness of application to all adnominal words and phrases that were attributive to nouns or to adjectives that were used as nouns. To the existence of a definite article is due the fact that Greek is more like English than Latin, for it permits, nay, compels an order of words that is logical and straightforward.

Modern Greek.— The Modern Greek language is a direct survival from the Ancient Greek, its surprising conservation of forms and vocabulary being due in part to the isolation of Greece from the currents of European progress, and to the conservative influence exerted by the Orthodox Greek Church upon the higher and literary forms of the language. Such changes in pronunciation, morphology and syntax as characterize the present form of the language may nearly all in their inception be traced back to the time of Christ. The language had acquired its present form, in all essential characteristics, as early as the 9th or 10th century A.D. To western scholars who, in reading Ancient Greek, use the Erasmian pronunciation, a supposed approximation to the pronunciation of the 5th century B.C., the spoken language of to-day is unfortunately absolutely unintelligible owing to the following facts: The vowels *η*, *ι* and *υ*, and the diphthongs *ει*, *οι*, *υι* and *ῃ* are, by what is technically known as iotacism, all pronounced like the *i* in machine; the diphthong *αι* is pronounced like *ε* (i. e., as the *e* in met); the *υ* of the ancient diphthongs *ευ* and *αυ* (this does not apply to *ου* which equals our *oo* in boot) is pronounced *v* before sonants (including vowels) and *f* before other sounds; *εὐαγγέλιον* = evangelion, and *ἐλευθερία* = elefftheria; the distinction between the ancient long and short vowels has entirely disappeared, an intermediate sound being uttered, which is, however, slightly lengthened under the influence of the accent, (e. g., o — unaccented is like the *ou* in ought and o — accented like the *aw* in brawny); *β* is pronounced as *v*, and *δ* like *th* in «this,» except where the ancient pronunciation has been preserved by a preceding *μ* or *ν* respectively. Thus *ἄνδρα*, man, is still pronounced «andra,» but is necessarily spelled, except in the puristic and literary language, *ἄντρα*; (so too *δέντρον*, a tree); *b* and *d* in foreign words are represented by *μπ* and *ντ*, (e. g., Lord Byron = *Λόρντ Μπαίρων*), combinations which are pronounced *mb* and *nd* when they occur in native Greek words, e.g., *πάντα* = panda; before *e* and *i* sounds *γ* is pronounced as a palatal voiced spirant, as in the German «Ja,» while elsewhere it has a guttural voiced spirant sound (like the *g* in the «goo-goo» of an infant); *ρ* is slightly trilled or, (and this applies also to *λ*, *μ*, *ν*,) slightly mouillé; the distinction between rough and smooth breathings disappeared more than 2,000 years ago. Ancient accent which was probably a differentiation in pitch, perhaps combined with a stressing of the syllable accented, gradually gave way, in the early centuries of the Christian era to a pure stress accent which is, however, except in northern Greece weaker than that of German and English. In consequence of this change and of the loss of all distinctions of quantity, the circumflex, acute and grave accents are pronounced alike, though the conventional written accent is preserved. The syllable anciently accented still bears the stress, except where this is influenced by the loss of distinction between long and short vowels. To foreigners one of the most puzzling features of Modern Greek is the very marked difference between the spoken and the written languages. Diglossy of vocabulary and diglossy of pronunciation exist in almost every language, but the influence of the learned Greek Corais in the early 19th century, and the desire of the Greeks to resurrect the ancient language at the time when Greece was freed from Turkish domination, resulted in a diglossy of forms and syntax — a diglossy of grammar — from which Greece has suffered ever since. Those who love the spontaneity and naturalness of ancient Greek find much that has been written in the last century frigid and artificial. Fortunately the large number of younger writers who believe that literature must be in the spoken language of the people, is gradually affecting the language of the platform, press and schoolroom. The following changes from the grammar of Ancient Greek are common to both the colloquial and the literary languages: The ancient optative, rarely used even in New Testament Greek, has now entirely disappeared, and the present subjunctive is distinguished from the present indicative only when printed, both forms being pronounced alike. The infinitive has been replaced by *νά* (a shortened *ἵνα*) with the subjunctive (e.g., *θέλω νὰ ὑπάγω*- I wish to go); the ancient *ἵνα* clauses being rendered by *διὰ νά*, «for to.» In the indicative we find the ancient forms fairly well preserved in the present, imperfect and aorist, but the future is expressed by *θά* (shortened from *θέλω νά*) with the present subjunctive, for a continued or habitual act, and with the aorist subjunctive to express a simple occurrence of the act. Ancient second aorists and aorists of the liquid form (e.g., *ἔστειλα*) have been preserved almost perfectly, proving the continuity of the modern with the ancient language. The perfect, pluperfect and future perfect tenses as in other analytic languages, are formed by making use of *ἔχω* (have), *ἔχω γράψῃ*, *εἶχα γράψῃ*, *θὰ ἔχω γράψῃ*, I have, had and shall have written. This change, precursors of which are found in Herodotus, Sophocles, etc., is less obtruded on our notice from the fact that the aorist is often used where English uses perfect tenses. In the nouns the dative case has given way to the accusative with various prepositions *εἰς* = to, *διά* = for, *μέ* (a shortened *μετά*) = with. The ancient *οὐ* is now expressed by *δέν* (from *οὐδέν*); the relative pronoun is *ὁ ὁποῖος*, and the interrogative is *ποῖος*; «why» is *διατί* and «because» *διότι*; «if» is, under all circumstances *ἐάν* or *ἄν* and the particle *ἄν* of the apodosis has disappeared. Shortened forms of *αὐτοῦ* (*τοῦ*, *τῆς*, *τόν*, *τήν*, etc.), are used as conjunctive pronouns and these as well as *μοῦ* and *σοῦ* (*ἐ*)*μέ* and *σέ* are used as enclitics when unemphatic; plural forms *μᾶς* and *σᾶς* have been formed from (*ἐ*)*μέ* and *σέ* (*σᾶς* from *σέ* being based on the supposed analogy of (*ἡ*)*μᾶς* from (*ἐ*)*μέ*). In spite of these changes the general appearance of the literary Greek of to-day is startlingly similar to that of ancient Greek. Chaucer's English is farther removed from the speech of to-day than is this literary Greek from the language of Xenophon and Aristotle. In the popular language the morphological changes have been far greater. An extended use of diminutive and other suffixes, and a tendency to cut off initial vowels when unaccented, have produced changes like: *λέων*, lion, to *λεοντάρι*; *ὄμμα*, eye, to *ὀμμάτιον*, and then to *μάτι* (where the root *ὀπ* has entirely disappeared; *ὄφις*, snake, to *φίδι* (*ὀφίδιον*). The nouns of the third declension have gone over into the first, the masculine having a nominative in *-ας* (cf. Ancient Greek *ταμίας*) *γείτονας*, a neighbor (anc. *γείτων*), and a genitive in *-α*, while the feminines have *-α* in the nominative and *-ας* in the genitive, *ἡ γυναῖκα*, *τῆς γυναίκας*. Nouns like *πόλις*, *βρύσις*, *κατάστασις* have virtually become *πόλη*, *βρύση* and *κατάστασῆ*, though they are often spelled *πόλι*, *βρύσι* and *κατάστασι*, in order to preserve the ancient root.

Certain phonetic laws, regularly operative, further disguise ancient words: *φτωχός* for *πτωχός*, *κόφτω* for *κόπτω*, *γιοφύρι* for *γέφυρα*, *κορφή* for *κορυφή*, *βρίσκω* for *εὑρίσκω*, *βγαίνω* for *ἐκβαίνω*, *ἀρίφνητος* for *ἀναρίθμητος*, *ἀδερφός* for *ἀδελφός*, *νύφη* for *νύμφη* will serve to illustrate changes, which seem extremely violent, but are easily classified and borne in mind.

The Greeks completely Hellenize foreign words, Turkish *touphek*, a gun, forming *τουφέκι*, a gun, *τουφεκίζω*, to shoot; *τουφεκιά*, a shot. A few Italian words, dating back in some cases to Latin times, exist in the language (e.g. *πόρτα*, a door; *σκάλα*, steps; *σπίτι* (*hospitium*, a house) but such foreign words do not seriously impair the genuinely Greek character of the language.

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GREEK LAW. The unity of Greek law is seen in the laws of inheritance and adoption, in the laws of commerce and contract and in the publicity given to legal agreements. There are incidental illustrations of Athenian laws in Plato's 'Laws' and in Aristotle's 'Politics'; but no systematic collection of Greek laws has been handed down to us. The 'Constitution of Athens' gives an account of the jurisdiction of the public officials and of the machinery of the law courts.

In Homer there is no word for law. *Dike* means a "way pointed out," the "course which usage prescribes." *Themis* signifies "what has been laid down," a particular decision, a "doom"; the plural *themistes* connotes a body of such precedents, "rules of right." Written laws came much later.

Lycurgus (about 884 B.C.) is said to have given Sparta her laws; but these were unwritten. Laws were first reduced to writing in the 7th century by the Epizephyrian Locrians in Italy (663 B.C.). Legislation in Crete is represented by the laws of Gortyn, made known by the discovery of an inscription in 1884. In Athens the tribunals of homicide were considered very ancient (Isocrates, *Panegyr.* 40). The king-archon decided cases connected with religious observances. In the middle of the 7th century the three archons were increased to nine; six of these were called *Thesmothetæ*, who superintended the judicial system. The first code was drawn up by Draco (621 B.C.). It distinguished carefully between different kinds of homicide. The lawgiver, Solon (594 B.C.), being elected archon, canceled all debts and mortgages on the person of the debtor and prohibited such slavery in the future. The power of voting in the law courts made the people masters of the Constitution. Permission to execute a will was first given by the laws of Solon. Cleisthenes (508) introduced the law of ostracism. In the next century commissioners (Syngrapheis) were appointed to draw up laws to submit to the assembly. The law court was called *dikasterion*. The public executioners were known as the "Eleven." The chief archon presided in cases connected with the family property of citizens; the king-archon in cases of impiety and homicide; the polemarch in cases affecting the Metics, or resident aliens.

The largest and most important courts were the Heliastic. Practically all cases of importance, except murder and homicide, were tried before these tribunals. The jurors were chosen every year and formed a body called the *Heliæa*, presided over by the *Thesmothetæ* (the six junior archons). The whole number of jurors was 6,000 in the 5th century, later 5,000. Of these the number sitting in any particular case varied from 200 to 2,500. There were 10 court-rooms. Each juror was given a staff bearing the color of the court — distinguished by the painted lintel — into which he was to go. This staff he exchanged at the door for a counter which he showed at the end of the day and received his fee of three obols. Law suits were divided into public and private. The plaintiff summoned the defendant, in the presence of witnesses, to appear before the magistrate, and named the day of trial. The suit was lodged by the presentation of a written indictment to the presiding officer. The defendant's answer also had to be in writing. Both sides brought forward their evidence, which was reduced to writing and sealed in a box to be kept until the day of trial, at which the clerk read both the charge and the answer. The plaintiff then made his speech, and was followed by the defendant. There were no "lawyers." Witnesses testified as they were called upon by the speakers *during* their addresses to the jury. Each side was permitted to question the opponent, who was obliged by law to answer; but there was no cross-examination of witnesses. The witness merely acknowledged that the testimony was his, after it had been read by the clerk. After the speeches of the contestants the case went to the jury, who proceeded to vote without retiring from the court-room. At first the ballots were mussel shells, but later they consisted of bronze discs with an axis running through the centre and extending on each side. Each juryman received two of these ballots, the axis in one of which was solid (acquittal), in the other, perforated (condemnation). The juror held the ballots in such a way that bystanders could not observe how he was voting. Into a bronze urn he cast the ballot recording his verdict, and into a wooden urn the other. In this way a secret vote was assured. The magistrate then counted the ballots and the verdict was announced by a herald. In case of a tie the defendant won. If the plaintiff in a public suit did not secure one-fifth of the votes he was fined 1,000 drachmæ. It was the jury's business to decide (after hearing proposals from both sides) what the penalty should be — ordinarily a money fine. Imprisonment was rare; but a man might be kept in jail until he paid his fine; and he might be imprisoned while awaiting trial, unless he could give security. Persons condemned to death were kept in confinement until execution. Even murderers might go at large until the day of trial arrived, for if a murderer escaped to another country the state felt that it was rid of a pollution without expense. But the laws of another state did not protect an exile, and he was at the mercy of any man. Hence banishment was one of the severest punishments that could be inflicted on criminals. Confiscation of property was a frequent penalty; and this carried with it a partial or total loss of the rights of citizenship.

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GREEK-LETTER SOCIETIES AND COLLEGE FRATERNITIES are found in nearly all leading educational institutions, particularly the great universities in the United States. Branches of the various societies are known as "chapters," and are found in nearly every college as well as in every large city in the country. No society has more than one chapter in any one college. While these societies are secret in character there is seldom any over-emphasis of ritual or mystery in their conduct, the protection of meetings, constitution and mottoes and the inviolability of the society's building or "hall," being all the secrecy involved. The Greek alphabet is generally used in naming a fraternity or a chapter. There are three types of badges worn by members, the name badge, monogram badge and symbol badge.

The oldest of these literary and social brotherhoods was established as early as 1776 and continued the sole society of its kind for 50 years. There were in 1915 society buildings of the American college fraternities 772 in number and valued at $14,326,915. That included men's, women's, professional, local men's and local women's fraternities, in all 123 societies, with a total membership of 471,354 and with 2,854 active chapters in the United States. It has become quite the practice for students of a particular fraternity to reside together during their college course in their "chapter" house. Princeton is the only prominent college in the country where the fraternal society is prohibited, and the fact that all the other leading institutions permit these organizations to exist affords strong presumption that they are regarded with favor, and that their influence is for good rather than for evil.

Phi Beta Kappa.— This, the oldest organization, is composed of 71 college chapters, and was founded 5 Dec. 1776, at William and Mary College, Williamsburg, Va. A chapter was formed at Yale, in New Haven, in December 1779, and soon after at Harvard, Dartmouth, Bowdoin and Amherst. The national council meets triennially. The badge of the society is a golden key.

Kappa Alpha.— Founded in 1825 at Old Union College by four members of the Phi Beta Kappa. It likewise had a golden key as a badge design. The first branch of this society was established at Williams College. The society had 9,281 members in 1915.

Sigma Phi.— Founded at Union College, Schenectady, N. Y., 4 March 1827, the society established branches at Hamilton, Williams, Hobart, Lehigh, Cornell and the universities of Michigan and Vermont. It had a membership of 2,929 in 1915. The badge of the society is of the monogram type; the colors are light blue and white. Among its members have been numbered Elihu Root, Andrew D. White and John H. Post.

Delta Phi.— Founded at Union College, 17 Nov. 1827, this society established branches at Columbia, Rutgers, Harvard, Johns Hopkins, Cornell and other colleges. The badge is in the form of a Maltese cross; colors blue and white. The fraternity had in 1917 more than 4,440 members.

Alpha Delta Phi.— Founded at Hamilton College, Clinton, N. Y., in 1832, the society established chapters in 29 other colleges and had a membership of 12,260 in 1915. There were 19 houses owned by the society and 24 active chapters. The badge is of green and white, with the star and crescent as symbols.

Psi Upsilon.— Founded at Union College, 24 Nov. 1833, this society had four of its original founders still living in 1902. The membership of the organization was (1915) 13,117, with 24 chapters in various colleges. The badge is of gold, diamond-shaped; colors garnet and gold.

Delta Upsilon.— Founded at Williams College in 1834, and had in 1915 chapters in 42 colleges and universities, with a membership of 13,209. It is an open, non-secret organization and owns 28 chapter houses.

Beta Theta Pi.— Founded at Miami University, Oxford, Ohio, in 1839, this was the pioneer society of the Middle West. It had a membership of 20,992 in 1915, with 77 active chapters. The badge is an eight-sided shield; the colors are light pink and blue.

Chi Psi.— Founded at Union College, in 1841, this was the first Eastern society to establish chapters in the West, extending its organization to the universities of Michigan and Minnesota. It had a membership in 1915 of 5,749 with 18 active chapters. The society is more secret than most of its fellows. The badge is a jeweled monogram.

Delta Kappa Epsilon.— Founded at Yale College, New Haven, Conn., 22 June 1844, by 15 members of the junior class. The society established 53 chapters and had a membership in 1915 of 18,923 — the second strongest numerically of college fraternities.

Zeta Psi.— Founded at the New York University, 1 June 1847, this society established 34 chapters, and had a membership in 1915 of 8,177. The badge is a monogram; the color white, with which each chapter blends its college colors.

Delta Psi.— Founded at Columbia College, New York, in January 1847; had seven chapters and a membership of 4,001 in 1915. The badge of the society is a Saint Anthony cross, bearing a shield of blue enamel.

Theta Delta Chi.— Founded like several of its predecessors at Union College, this society was organized in 1848; had (1915) 29 chapters and 7,058 members. The badge is a monogram; the colors black, white and blue.

Phi Gamma Delta.— Founded at Jefferson College, Canonsburg, Pa., in May 1848, this society had 58 chapters and 15,362 members in 1915. The badge is a diamond-shaped shield on a field of black, bound by a golden cord; the color royal purple.

Phi Delta Theta.— Founded at Miami University, Oxford, Ohio, 26 Dec. 1848, this society had 78 chapters and 20,016 members in 1915. The badge is a shield, bearing a scroll; the fraternity colors are argent and azure.

Phi Kappa Sigma.— Founded at the University of Pennsylvania, 16 Aug. 1850; number of chapters 29 and membership 5,471 in 1915. The badge is a gold Maltese cross, with a skull and crossbone centre; the colors are old gold and black.

Phi Kappa Psi.— Founded at Jefferson College, Canonsburg, Pa., 19 Feb. 1852; membership 14,176 in 1915. The badge is a shield of gold; the colors pink and lavender.

Sigma Chi.— Founded at Miami University, Oxford, Ohio, 20 June 1855; organized 68 chapters with 14,678 members. The badge is a cross of gold and white enamel; the colors are blue and gold.

Sigma Alpha Epsilon.— Founded at the University of Alabama in 1856; organized 78 chapters; (1915) 16,948 members.

Alpha Tau Omega.— Founded at the Virginia Military Institute, 11 Sept. 1865; organized 60 chapters; had a membership of 11,854 in 1915.

Kappa Sigma.— Founded at the University of Virginia in 1867; established 82 chapters; had 13,654 in 1915. The badge is a crescent and star; the colors old gold, maroon and blue.

Sigma Nu.— Founded at the Virginia Military Institute, 1 Jan. 1869; organized 72 chapters; a membership of 11,719. The badge is designed after that of the Legion of Honor of France; the colors are black, white and gold.

Phi Sigma Kappa.— Founded at the Massachusetts Agricultural College, 15 March 1873; organized 28 chapters still active; owned nine chapter houses, valued at $188,000; membership 4,083 in 1915. The colors of the society are silver and magenta.

Among the Greek-letter societies of women are the Alpha Chi Omega, Alpha Phi, Delta Delta Delta, Delta Gamma, Kappa Alpha Theta, Kappa Kappa Gamma and Pi Beta Phi. The Alpha Phi was founded in 1872; had 18 chapters and 2,954 members in 1915. The Delta Delta Delta was founded in 1888; had 52 chapters in 1915 with a membership of 4,560.

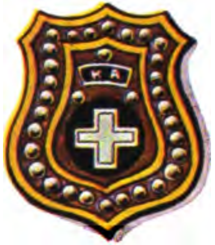
The largest membership among the women's college societies, 8,162, is reported by Pi Beta Phi, founded in 1867. The largest investment in or outlay upon houses made by any of the Women's Greek-letter societies prior to 1915 was $125,250 by Kappa Kappa Gamma, founded in 1870 and owning nine chapter houses in 1916.

Most famous and distinguished among all college or university secret societies are undoubtedly «Scroll and Key» and «Skull and Bones.» These are both senior class organizations in the academical (or strictly «college») department of Yale University; in each the active membership is limited to 15 seniors; during 75 years they have been generous rivals for supremacy; no chapter of either exists elsewhere.

GREEK LITERATURE. Ancient Greek literature because of its originality, spontaneity and intrinsic value and interest, deserves the closest study. In spite of the very severe losses which it has unfortunately sustained there is extant a very considerable body of the literature representing the various fields of literary activity. The influence of Greek literature on Latin literature was enormous, while the indebtedness of English literature, especially poetry, to the Greek is profound.

Ancient Greek literature may be divided into five great ages or periods: (1) The Age of Epic Poetry (from the beginning to the 7th or the beginning of the 6th century B.C.). (II) The Age of Lyric Poetry (the 7th, 6th and part of the 5th centuries B.C.). (III) The Attic Period (c. 475–300 B.C.). (IV) The Alexandrian Age (from c. 300 B.C. until the Roman Conquest, 146 B.C.). (V) The Græco-Roman Age (from 146 B.C. to Justinian, 527 A.D.). To these may be added the Byzantine Period (from 527 A.D to the Fall of Constantinople in 1453 A.D.).

I. The Age of Epic Poetry.— Greek literature, and European as well, begins with the Homeric poems, the 'Iliad' (q.v.) and the



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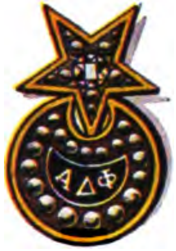

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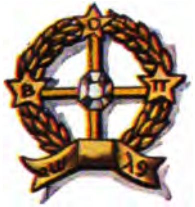
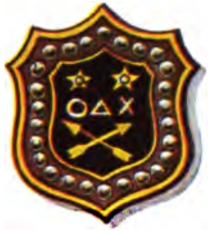


BETA PI

DELTA GAMMA



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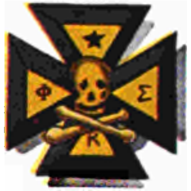

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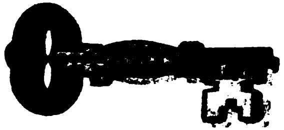

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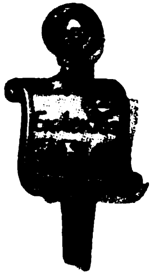

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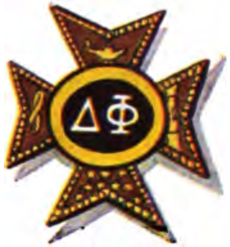

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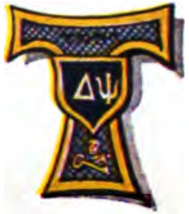

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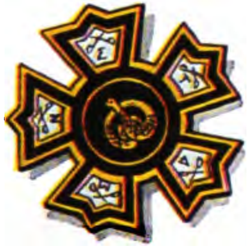

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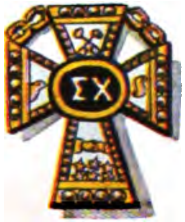

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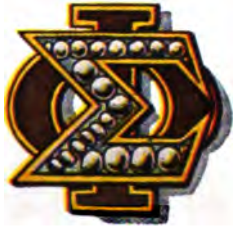

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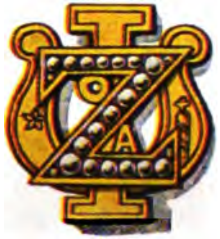

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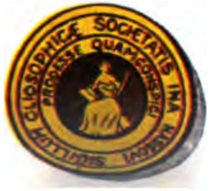
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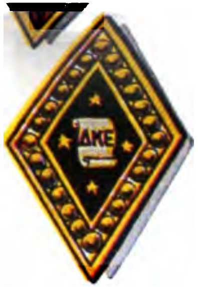
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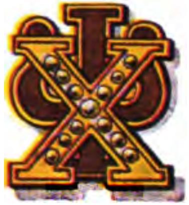
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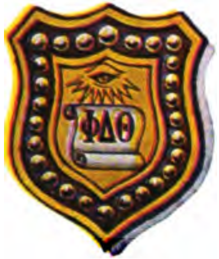
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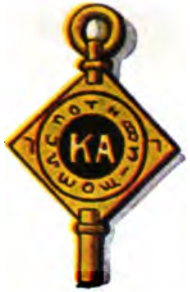
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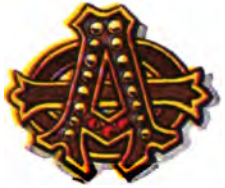
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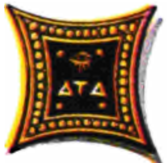
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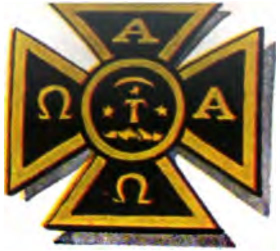
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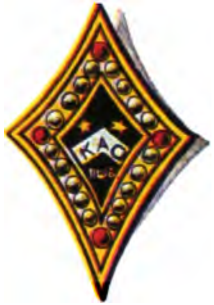
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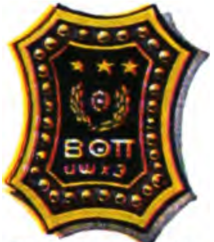
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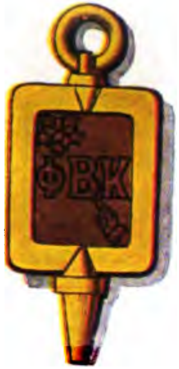
WOLF'S HEAD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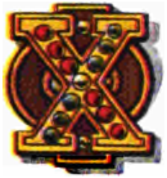
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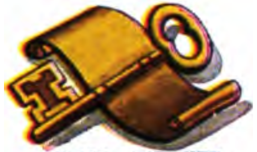
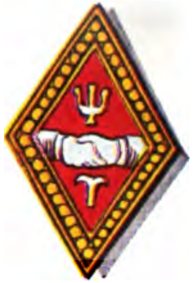

SCROLL AND KEY

EPSILON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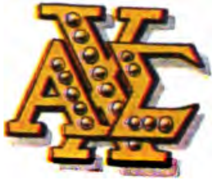
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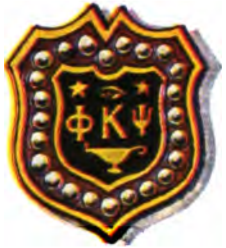
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FRATERNITY BADGES OF COLLEGES AND SOCIETIES

'Odyssey' (q.v.). The origin, date and authorship of these two eternally famous epic poems were vexed questions in the Alexandrian Age and are still subjects of vigorous contention at the present time. We may say, very briefly and rather dogmatically, that the 'Iliad' and 'Odyssey' were in their perfected form by the end of the 8th century B.C.; that they probably originated in Asia Minor, in Ionia, although subjected to some Æolic influences; that they *may* have been the products of the same poetic school, and, as some scholars now maintain, *may* have been composed by *one* poet, the traditional Homer. Certainly these two great epics in dactylic hexameters, handed down to us in the Epic-Ionic dialect, were the culmination, and not the beginning, of an epoch of literary activity. In them we can discern early legends, hymns and folk-songs, e.g., the marriage-song (*hymenæus*) and the dirge (*thrênos*); and, in particular, the songs celebrating the deeds of heroes, themes which form the nucleus of the later epic. The 'Iliad,' divided by the Alexandrian scholars into 24 books, tells the story of the great Greek hero Achilles at the siege of Ilium and of his wrath; the 'Odyssey,' also in 24 books, narrates the exciting adventures and delayed home-coming of the intrepid Odysseus of Ithaca. The virtues of the Homeric style are admirably characterized by Matthew Arnold: it is rapid; plain in thought; plain in diction; and noble. The Homeric poems are the greatest of the world's epic poems. Their influence on Greek Literature, and Greek thought and ideals in succeeding centuries, is incalculable.

Later than the 'Iliad' and 'Odyssey' there arose an Epic Cycle (the Cyclic Poems), no longer extant, which comprised such epic poems as the 'Cypria,' the 'Little Iliad,' the 'Sack of Ilium,' the 'Nostoi,' etc. For convenience we must discuss at this point the 'Homeric Hymns' although they are much later than the Homeric poems. They are really preludes, for the most part, to epic recitations, composed and recited by bards in praise of the gods. These poems, 34 in number, in hexameter verse with considerable Homeric coloring, date mostly from the end of the 8th to the beginning of the 5th centuries B.C. Several of the 'Homeric Hymns' are of some length, interest and poetic value, e.g., the Hymn to the Delian and Pythian Apollo (546 lines) and the Hymns to Hermes, Aphrodite, Demeter and Dionysus. (Consult Shelley's charming versions in English). Much later than Homer, but also falsely attributed to him by antiquity, are the two sportive epics, the 'Margites' and the 'Batrachomyomachia' (Battle of the Frogs and Mice). Of the latter we have some 300 lines.

The second great name in Greek Literature is that of Hesiod of Ascra, a little village in Bœotia. In date he is, perhaps, of the early part of the 8th century. Although Hesiod is numbered among the Epic poets and employed the dactylic hexameter with many Homeric tags and reminiscences he is really of the didactic and gnomic school. His extant writings are the 'Works and Days,' a sort of farmer's almanac and calendar with useful precepts on husbandry, navigation and advice on life and behavior in general, and the 'Theogony,' which sketches the origin of the universe and the relationship of the gods. The 'Shield of Heracles' is undoubtedly spurious. These Hesiodic poems, although of no great poetical merit generally speaking, had very considerable influence on later Greek thought and religion. The 'Works and Days,' indeed, served Virgil as model for his 'Georgics' (q.v.).

II. The Age of Lyric Poetry.— Strictly speaking Lyric poetry should designate poetry sung to the lyre only, but the term lyric is rather loosely used to include elegiac and iambic as well as melic (i.e., sung) poetry. Lyric poetry was the outcome of that turbulent period in Greek history which was characterized by social upheaval in many states in connection with the establishment of the successive political stages of oligarchy, tyranny and democracy, an age when men were more widely informed and were thinking for themselves. While lyric poetry flourished throughout the Greek world generally, and was composed by poets in the three chief dialects (Æolic, Doric and Ionic), it had its origin in Ionia. Elegy, strictly speaking, may be defined as mournful poetry, i.e., the funeral dirge sung to the accompaniment of the flute, but the term is applied to any poetry of a reflective, emotional character in the elegiac distich. This couplet consists of a dactylic hexameter followed by a dactylic pentameter (so-called). Elegy early lost its exclusively funereal character and was used for martial poetry by Callinus of Ephesus (first half of the 7th century B.C.) and by Tyrtæus (c. 640 B.C.) at Sparta. It was first used for the expression of love by Mimnermus of Smyrna (c. 620 B.C.) who thus was the father of the erotic elegy, a literary form popular among the poets of the Alexandrian Age, who, in turn, inspired the Roman elegists, e.g., Catullus, Ovid, Propertius and Tibullus. Theognis of Megara (c. 540 B.C.) is the chief exemplar of the gnomic, or moral, elegy. Of his writings some 1,400 lines are extant. Solon (c. 600 B.C.), the great Athenian law-giver, used the elegy for political moralizings; Xenophanes employed it for philosophical teachings. The master of the funereal elegy is Simonides of Ceos who is famous for his commemorative epitaphs on the Greek heroes who fell in the Persian Wars.

Iambic poetry, contemporaneous with elegy, was "invented," as the Greeks said, or rather perfected, by Archilochus of Paros (c. 660 B.C.), as a weapon of satire and invective. Semonides of Amorgos (c. 640 B.C.) and Hipponax of Ephesus (c. 540 B.C.) (who invented the choliambic or *skazon*) likewise employed the iambus for satire. But both the iambic and trochaic meters were used for purposes other than satire.

While iambic and elegiac poetry might be merely recited or declaimed, melic verse (lyric poetry proper) of necessity was sung to musical accompaniment. It was of two forms, *monodic*, of Æolic origin, for one voice, or *choral*, as developed by the Dorians, for a chorus. The monodic melic, whose first representative was Terpander (c. 675 B.C.), is known to us through the poetry of Sappho, Alcæus and Anacreon. The fragments of the verse of the poetess Sappho of Lesbos (c. 600 B.C.), tantalizingly scanty, reveal poetic gifts of marvelous power and remarkable emotional intensity. Alcæus, likewise of Lesbos, poet of love and of war, together with his contemporary Sappho, inspired much of the poetry of Horace in sentiment and form (e.g., the Alcaic and Sapphic stanzas). Anacreon of Teos (c. 530 B.C.), poet of pleasure, was an Ionian. His name is largely known to students of English poetry because of the spurious and much later 'Anacreontea' which long passed for genuine. (See Odes of Anacreon and consult the pleasing versions of Byron). The Dorian choral lyric is represented by the scanty, but interesting, fragments of the melic poetry of Alcman (c. 650 B.C.) who lived at Sparta, of Stesichorus of Sicily (c. 620 B.C.), of Ibycus of Rhegium (c. 550 B.C.) and Simonides of Ceos (480 B.C.), an Ionian, who was renowned not only for his elegies, as previously mentioned, but for his love-lyrics, dirges, epinikia and encomia. Greatest of all the Greek lyric poets, however, is Pindar of Thebes (c. 470 B.C.). While he won fame in all branches of melic poetry his chief renown was in epinikia, i.e., odes celebrating the victors in the four great Greek games. Of these magnificent odes we have no less than 44. They are splendid in imagery and diction, bold in conception and lofty in style. Of this same period is Bacchylides of Ceos, nephew of Simonides, a lyric poet of distinction, but inferior to Pindar.

III. The Attic Period (475–300 B.C.).— In the Attic Period, in the 5th and 4th centuries B.C., the Greek genius revealed itself in all its splendor in magnificent achievements, especially in literature and art. In Athens, democracy and universal enlightenment stimulated remarkable literary activity in varied forms. In poetry, the drama, both tragedy and comedy, flourished. In prose, crude literary beginnings were rapidly succeeded by complete mastery in history, in rhetoric and in philosophy.

A. *The Drama.*— The origin of Greek tragedy is an open question at present writing. Some scholars find the origin in the ritual performed by the chorus worshipping dead heroes at the tomb; others, in the ritual which celebrated the annual death and rebirth of vegetation that was a feature of the cult of Dionysus. The traditional view, however, is that tragedy developed from the *dithyramb,* a choral lyric of Dorian origin (first perfected by Arion, c. 600 B.C.) sung and danced at festivals by a chorus of 50 men or boys in honor of Dionysus, the wine-god. As this chorus was sometimes dressed as satyrs (goat-like followers of Pan) their song was called *tragoedia* (goat-song). Thespis of Icaria in Attica (in the middle of the 6th century B.C.) took the next step in the development of tragedy by stepping out from the chorus of satyrs and addressing verses to them. Here we have the germ of the drama. Complete development came with the introduction of a second actor by Æschylus, and a third by Sophocles, together with the reduction of the satyr chorus from 50 to 12 by Æschylus, and to 15 by Sophocles and his successors. Tragedy was indebted to Homer and the epic cycle for subject-matter, the iambic verse perfected by Archilochus being substituted in the dialogue for the epic dactylic hexameter, and to lyric poetry for the choral element.

Of the 70 tragedies said to have been written by Æschylus (525–456 B.C.) only seven are extant. In chronological order they are: 'The Suppliants,' the 'Persians,' the 'Seven against Thebes,' the 'Prometheus Bound' (q.v.), and the 'Oresteia' (q.v.), the last named being the only surviving trilogy, comprising the 'Agamemnon,' the 'Choephori' and the 'Eumenides.' The 'Persians' is of special interest as it is the only extant Greek tragedy with the story taken from contemporary history. It tells of the defeat of the Persians under Xerxes and contains a stirring account of the battle of Salamis. The 'Prometheus Bound,' portraying the awful punishment of the benefactor of human-kind, that hero who stole fire from heaven as a boon to man, is a magnificent poetic drama. In the trilogy of the 'Oresteia,' the 'Agamemnon,' perhaps the greatest Greek tragedy in poetic merit, tells the story of the return home of the victorious hero Agamemnon from Troy and his foul murder at the hands of his wife, Clytemnestra, and her paramour, Ægisthus. Æschylus is a tragic poet of great imagination, lofty style and profound religious feeling.

Sophocles (c. 496–406 B.C.), the second of the great tragedians of Athens, is also represented by seven extant tragedies. These are the 'Antigone' (q.v.), 'Ajax,' 'Œdipus Tyrannus' (q.v.), 'Trachiniæ,' 'Electra,' 'Philoctetes' and 'Œdipus at Colonus.' In the impressive tragedy 'Antigone' the heroine, Antigone, suffers a martyr's death because she gives holy rites of burial to her brother Polyneices in defiance of the edict of Creon, King of Thebes. In the 'Ajax,' the hero of that name, defeated in the contest for Achilles' armor, slays himself and is grudgingly awarded honorable burial. The 'Œdipus Tyrannus,' the greatest Greek tragedy in plot construction, was Aristotle's model play. The 'Trachiniæ' is interesting to moderns in that it, like the Antigone, contains the theme of love. The 'Electra,' a drama of revenge, has the same theme as the 'Choephori' of Æschylus. It tells of the return from exile of Orestes and the slaying of Clytemnestra and Ægisthus by Orestes, abetted by his sister, Electra. Of the three great Athenian tragedians Sophocles is perhaps most typically Greek. In plot, in delineation of character and in style he is well-nigh faultless. He is a literary artist and the embodiment of the Hellenic ideal, the golden mean.

Of Euripides (480–406 B.C.) no less than 19 tragedies survive. Only a few of the greatest may here be mentioned: the 'Alcestis' (q.v.), a story of a wife's devotion and sacrifice; the 'Trojan Woman,' a pathetic and graphic portrayal of scenes following the fall of Troy. The 'Iphigenia among the Taurians,' an excellent and appealing play with happy ending, and the 'Medea' (q.v.), a moving story of the dread revenge inflicted by the Colchian sorceress upon her faithless husband, Jason. Although Euripides lived in the same century as Sophocles and Æschylus he seems to belong to a later age for he was a radical and distinctly ahead of his own generation in thought and method. In his plays we find religious scepticism and note the influence of the new rhetoric. Euripides was a realist and, as the ancient tradition asserts, painted men as they are, while Sophocles painted them as they should be. On the technical side his innovations were: a formal prologue, and the ***deus ex machina.*** While Euripides is inferior to Æschylus in creative poetic ability, and does not equal Sophocles as a literary artist, he is a playwright of first-rate ability, and as a lyricist rises at times to lofty height. Furthermore, of the Greek tragedians his influence has been the greatest on succeeding ages for he served as model for Roman tragedy and the French classical drama.

Comedy came to development a little later than tragedy. Like tragedy it had its origin among the Dorians and in the worship of the god, Dionysus, but the germ of it is to be found in the *phallic* songs and satire of the rustic festivals. In Greek comedy there are three periods: Old Comedy to c. 390 B.C.; Middle Comedy, c. 390–320 B.C.; and the New Comedy, after 320 B.C. Old comedy is characterized by personal and political satire and abuse. Its great representative is Aristophanes (born c. 448 B.C.) of whom 11 comedies are extant. Of especial interest is the ‘Clouds,’ which is devoted to a humorous, although caustic and undeserved attack upon Socrates. In the ‘Frogs’ (q.v.), Euripides, despised by Aristophanes, is the butt. Other comedies are: ‘Acharnians,’ ‘Knights,’ ‘Wasps,’ ‘Peace,’ ‘Birds,’ (q.v.), ‘Lysistrata,’ ‘Thesmophoriazusæ’ ‘Ecclesiazusæ’ and ‘Plutus.’ The Middle comedy, a period of transition, is represented only by scanty fragments. The New comedy, "mirror of human life," is a comedy of manners, a delineation of stock characters in society. The famous and popular master in the field of the new comedy is Menander (342–291 B.C.) who was known to us until recently only through the medium of scanty fragments, and the comedies of the Latin writers, Plautus and Terence. But in 1905, in Egypt, there were discovered large portions of four of his plays.

B. *Historical Prose.*—As compared with verse Greek prose was of slow development. If we disregard early Ionian chroniclers and compilers whose writings, devoid of any charm of style are lost, the first important name is that of Herodotus (5th century, B.C.), the "Father of History." His fascinating ‘History’ (in nine books, written in the Ionic dialect) tells the story of the growth of Persia and her wars with Greece. The chronicle is enlivened by many entertaining anecdotes. The style, while loose in structure and parenthetical, has great charm and lucidity. Herodotus is not a critical or scientific historian in the modern sense of the term, but his work, properly estimated, is of very great value.

Thucydides, in his ‘History of the Peloponnesian War,’ in eight books, has a different conception of the historian's task. A contemporary of, and participant in, the long struggle for supremacy between Athens and Sparta, he strives to give an accurate account not only of the actual events of the war but also of their causes. His style is rather austere, and shows strongly the influence of the rhetorical tendencies which were potent at the time. Prominent in his work are the speeches, of which the most famous is the ‘Funeral Oration’ of Pericles in Book II. Of great interest, too, is the account of the ill-fated Sicilian Expedition and the description of the ravages of the plague in Athens.

The third and last historian of the Attic Period is Xenophon (born about 431 B.C.) the author of the ‘Hellenica’ and ‘Anabasis’ (q.v.) In the ‘Hellenica,’ a work of no great inspiration, the narration of Hellenic affairs is continued from the conclusion of Thucydides' history down to the battle of Mantinea (362 B.C.). The ‘Anabasis’ is a work of permanent value by reason of the interest of the subject-matter and the freshness of its style. It tells the story of the march inland into Asia of the 10,000 Greek mercenaries under Cyrus, the young Persian prince; of the death of Cyrus; of the vigorous leadership of Xenophon, who accompanied the expedition, and their adventurous, but successful, trip home. Xenophon's ‘Memorabilia’ or Recollections of Socrates pictures the Master on the personal side. Minor essays are also extant.

C. *Rhetoric and Oratory.*—Two factors contributed to the development of oratory and stylistic Greek prose: The Sicilian rhetoric and the influence of the teachings of the Sophists (e.g., Protagoras and Prodicus) the majority of whom came from Ionia. The first handbooks of formal rhetoric were written by Corax and Teisias, and their pupil, Gorgias, who made popular the ornate, antithetical style, by his captivating speeches and teaching throughout Greece. Athens of the latter half of the 5th century, and in the 4th, took the keenest interest in public-speaking and rhetoric. Of the many Attic orators of this period a list of the ten greatest was drawn up in the famous ‘Canon’ by Alexandrian critics. These orators are as follows: Antiphon (c. 480–411 B.C.), rugged and austere in style, all of whose 15 speeches are concerned with murder causes. Andocides (born about 440), an "amateur," has three speeches extant of which the most interesting is the ‘On the Mysteries.’ Lysias, a metic (resident-alien) at Athens, adopted the profession of writer of speeches for litigants. Thirty-four speeches are extant under his name. Of these the ‘Against Eratosthenes’ was spoken by Lysias himself. He is regarded as a master of the Attic idiom, and is noted for clearness and vividness of style and is particularly esteemed for his skill in delineation of character. Isocrates (436–338) will always hold a prominent place in the history of rhetoric. He was a Sophist, in the best sense of the term, and conducted an influential school in Athens for over 50 years. He taught rhetoric as a "philosophy" and defended it as an effective preparation for life. Because of temperamental defects he was not a public speaker but devoted himself to the composition of pamphlets, or discourses, in which teaching he aimed to make contributions of permanent value. Of especial interest are the ‘Panegyricus’ (his masterpiece, 380 B.C.), in which he expounds his cherished political idea, viz., the subjugation of Asia by a united Hellas, the ‘Panathenaicus’ and the ‘Philip.’ His theory of culture is elucidated in the ‘Against the Sophists’ and the ‘On the Antidosis.’ In style, Isocrates is smooth: his periods are lengthy and flowing. The influence of Isocrates has been very great upon subsequent Greek writers, upon Cicero, and upon modern literary prose. Isæus specialized in the writing of speeches involving will-cases and of these discourses 11 are extant. Demosthenes (384–322) is by far the greatest ancient orator and a master of all the oratorical virtues. In the ‘Olynthiacs’ and the ‘Philippics’ Demosthenes vigorously opposed the growing power of Macedon and urged, largely in vain, lethargic Athens to more active resistance to Philip. Demosthenes' masterpiece is the famous speech 'On the Crown' (see Oration on the Crown), in which Demosthenes successfully defends his whole public career and shows himself worthy of the golden crown of honor which was proposed by Ctesiphon and opposed by his rival, Æschines. The superlative virtues of Demosthenes as orator and statesman are attested by the unanimous praise of ancient and modern critics. The remaining four orators of the Canon of the Ten are: Æschines, defeated rival of Demosthenes; Lycurgus, the great Athenian statesman and financier; Hypereides, and Deinarchus.

D. *Philosophy.*— The fourth and last sphere of literary activity in the Attic period is that of philosophical prose. Here there are but two writers of commanding eminence, Plato and Aristotle. With the philosophical views and doctrines of these world-famous thinkers we are not here concerned. We shall merely sketch their literary achievements. Plato (c. 427–347 B.C.), founder of the Academy, is regarded by many critics as the greatest master of Greek prose style. His beautiful prose is often akin to poetry and reveals a literary artist of vivid imagination, inimitable charm, and keenest wit. In Plato's 'Dialogues' we have a comprehensive exposition of the ethical views of his teacher, Socrates who left no writings. Perhaps the best known of the works of Plato is the 'Republic' (q.v.), which is an inquiry into the nature of justice and a description of an ideal state founded on this virtue. Of peculiar interest is the series of dialogues concerned with the last days and death of Socrates, namely, the 'Euthyphro,' the 'Apology' (Socrates' speech in his own defence when on trial for his life), the 'Crito,' and the 'Phædo' (on the immortality of the soul).

Under the name of Aristotle (384–322 B.C.), Plato's pupil, an incredibly large collection of writings has come down to us. It is probable that some of these works were written by his pupils, perhaps on the basis of lecture-notes. Aristotle was a profound thinker and investigator and followed the most varied interests; his treatises, therefore, are concerned with diverse subjects. Students of literature and the drama are especially interested in the 'Rhetoric' (the art of Persuasion) and the 'Poetics' (a treatise on the poetic art (q.v.). Aristotle's style has little charm; it is scientific prose which at times is easily intelligible and then again involves difficulty of interpretation largely through the technical terminology.

IV. The Alexandrian Age (c. 300 B.C.–146 B.C.).— After the 4th century B.C. Athens no longer occupied the supreme position in literature and the arts. Alexander's conquests were not only followed by Athenian political decline but Hellenic culture was spread widely throughout Asia and Egypt and gave the impulse to the founding and rapid growth of new Greek cities. Alexandria, founded by the Macedonian conqueror in 332 B.C. became a centre of learning with a Museum and large library which attracted numerous scholars, teachers, and students. Grammar and lexicography were much studied. Editions of selected classic writers of previous centuries, with commentaries, were industriously produced by such learned scholars as Zenodotus, Aristophanes of Byzantium, and Aristarchus, all of whom won fame, particularly in the study of the Homeric poems. But in general it may be said that the creative age was over. Erudition, scholarship and literary industry flourished during the Alexandrian Age but there were few works of great originality such as had almost been the rule during the Attic Period. A brilliant exception is Theocritus (3d century B.C.), who lived in Sicily, Alexandria and Cos. He was the founder of pastoral poetry and his charming bucolic idyls have enjoyed great popularity and have ever profoundly influenced poetry of this type, as, for example, Virgil in his 'Bucolics' (Eclogues) and numerous English poets, e.g., Tennyson. The names of Bion of Smyrna (contemporary of Theocritus) with his 'Lament for Adonis,' and of Moschus (c. 140 B.C.), author of the 'Lament for Bion' and 'Europa,' are generally coupled with that of Theocritus, a greater master in poetry of this *genre*. Other poets of the age are the erudite Alexandrian Callimachus (c. 260 B.C.), composer of hymns, elegies and epigrams, and Apollonius of Rhodes, author of the epic poem, the 'Argonautica,' a source for Virgil. In this period likewise we may place the 'Mimes' of Herondas, and the astronomical verses of Aratus. The excellent history of Polybius (c. 150 B.C.) is a valuable source of information particularly for the first Punic War. See Idyls of Theocritus, Bion, and Moschus.

V. The Graeco-Roman Age (146 B.C.–527 A.D.).— In any sketch of Greek literature no hard and fast line can be drawn between the Alexandrian and Roman Ages. Literary activity continued to flourish without any break throughout the Greek world under Roman sway or, rather let us say, throughout the politically supreme Roman Empire which was dominated by Greek culture. The one great original genius of this age is Lucian (2d century A.D.), the pioneer and master in a new field, the romance. Born in Syria, he traveled and studied widely, residing for a time in Athens. Lucian is rhetorician, satirist, sceptic and wit, all in one. Very famous are the satiric Dialogues 'Of the Dead,' 'Of the Gods,' and 'Of the Sea,' and his 'True History,' a model much imitated by writers of extravagant fiction ever since Lucian's day. In the province of biography, Plutarch (1st century A.D.) won fame by his 'Parallel Lives' and 'Morals.' Worthy of mention are the 'Geography' of Strabo (1st century B.C.), the guide-book of Pausanias (2d. century A.D.), a work of great value for a knowledge of Greek monuments and topography; the general history of Diodorus Siculus; the excellent literary criticism of Dionysius of Halicarnassus (1st century B.C.), and pseudo-Longinus; the Roman histories of Appian and Dio Cassius; the historical treatise on Alexander of Arrian; the 'History of the Jews' of Josephus; the useful miscellany, the 'Deipnosophistæ' of Athenæus (c. 200 A.D.); the compilations of Stobæus; the medical works of Galen, and the notable 'Meditations' (q.v.) of the great Stoic Emperor, Marcus Aurelius Antoninus (131–180 A.D.). The beginnings of the novel should also be noted in the romances of Longus, Heliodorus, and Achilles Tatius.

The brief outline of this period should not be concluded without a few words concerning the Greek Anthologies or Collections of epigrams, beginning with Meleager (c. 60 B.C.), and the much later and enlarged collections of Agathias (6th century A.D.); the 'Palatine Anthology' of Cephalas (10th century A.D.), and the 'Planudean Anthology' (14th century A.D.). In these large collections we possess several thousand short poems or *epigrams* (in the Greek sense of the term), largely in the elegiac meter, dating from 700 B.C. to 1000 A.D. Many of these little poems treating of love, life, death, fate, etc., are charming; some have genuine inspiration.

The Byzantine Period to the Fall of Constantinople (527–1453 A.D.).— By the designation Byzantine we mean the long period of many centuries during which Byzantium (Constantinople) was the centre of Greek culture in the East. The language which was the medium of expression of this culture was still Greek; the civilization was naturally much influenced by Rome. In literature there was great productivity but it is, on the whole, lacking in originality and has little interest for the modern world except for the theologian, the historian, or the specialist. The field is enormous and can be but briefly surveyed here. In the early part of the Byzantine period theology held a dominant position in intellectual interest. The mass of theological literature is great and includes such writings as the works of the famous scholars, Eusebius, Synesius, Basil, Gregory of Nyssa and Gregory of Nazianzus, and Saint Chrysostom. These Christian Fathers, many of whom are of the 4th century A.D., might, with greater chronological accuracy, be placed in the Graeco-Roman period, but in their influence and interests they are rather Byzantine. John of Damascus (8th century A.D.) and Photius (9th century A.D.) must also be mentioned among the prominent theologians whose writings and teachings were influential. Second in importance in this age is historical writing. This province is represented by Procopius, who wrote of the times of Justinian; Agathias (6th century); Nicephorus Briennius, and his wife Anna Comnena (11th century A.D.). Among the compilers, or chroniclers, who have handed down accounts of the Byzantine Empire, are Theophanes, Georgius Monachus, and John Zonaras. Philosophy, lacking a congenial environment, did not flourish during this period. Rhetoric was industriously cultivated but the voluminous literary output is of indescribable aridity and dreariness. (Consult Walz, 'Rhetores Græci,' 9 vols.). Of especial value to modern students are the numerous stupid, but often extremely helpful, compilations, commentaries, lexicons, etc., which are based upon, or are explanatory of, the ancient classical writers. We possess, for example, the Lexica of Suidas, Photius, and the 'Etymologicum Magnum'; the 'Scholia' (explanatory notes) of Eustathius on Homer; and the commentaries of Tzetzes, of Moschopulus, and Thomas Magister. Of decided importance is the 'Bibliotheca' or 'Muriobiblon' of Photius, patriarch of Constantinople (9th century A.D.). In this work he has handed down to us abstracts and critiques of some 280 ancient books. Since many of these works are now lost these synopses are of value. Unfortunately Photius neglects poetry and over-emphasizes the theological writers. The best poetry of the Byzantine period is to be found in he Greek 'Anthology.' An account of this great collection of short poems has already been given. For a scholarly and detailed treatment of this whole Byzantine era in literature the reader should consult Krumbacher, 'Geschichte der byzantinischen Litteratur' (Munich 1897). See BYZANTINE LITERATURE.

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GREEK MUSIC, the theory and practice of melody and harmonics among the ancient inhabitants of Hellas. The subject of Greek music is an obscure and difficult one, but there are enough data extant to afford us a general idea of the Greek musical scale, of the use of instruments, and employment of the voice in solo and chorus among the Greeks. The earliest notion of music was derived from the necessity of keeping time in the dance. This at first would be effected by merely clapping the hands. The use of instruments of percussion would follow, and the drum and cymbal came into use. The cymbal originated in Egypt, and reached Greece as a permanent element in the practice of music. The rustle of the wind through the reeds, sometimes with a shrill whistling vibration, suggested the application of the human breath to hollow pipes, and what is still called the Pan's pipes was invented. Wind instruments of various kinds came afterwards into vogue, the flute, and the double flute were employed, and seem generally to have been blown as accompaniments to the elegy and the love song. These pipes were of various kinds and were considered as good accompaniments to the recitations of the poet, as well as for regulation of movement in a dance. They were employed in the ceremonies of the mysteries, and Plato speaks of an often recurring thought as resembling «the sound of the flute in the ear of the mystic.»

Instrumental music attained its highest development in the invention of the lyre. The Egyptians attributed this invention to their god Thoth. In Greece Hermes is celebrated as the inventor of the lyre, which became henceforth the instrument of the epic poet and the rhapsode or reciter. It had originally four strings, which it is said were suggested by the tendons stretched over the shell of a tortoise. The first Greek philosopher to attempt a scientific theory of musical scales and intervals appears to have been that profound and versatile man Pythagoras (585 B.C.). The Greeks did not use the word music in application to the art which we so name. Music to them comprised everything which the Muses inspired, and even history and astronomy as well as poetry were music. What we mean by the term was called by the Greeks harmonics, which means the art of fitting, that is, adjusting the intervals in a scale, in the strings of a lyre. The scale of Pythagoras had seven notes, corresponding with the seven strings of his lyre, and he professed to derive his idea of music from the music of the spheres. The sun revolving round the earth was to him the chief planet, and was represented by the middle string of the lyre which was considered the keynote, corresponding with A in the modern scale. On one side were strings representing Mercury, Venus and the Moon, on the other side three more corresponding with Mars, Jupiter and Saturn. It is said that Pythagoras discovered the ratios of the perfect intervals from hearing blacksmiths striking an anvil with hammers of different weights. Aristoxenus (B.C. 300) discovered the difference between the major and minor tones and has been called «the father of temperament.» Claudius Ptolemy (B.C. 150) demonstrated the musical axiom which obtains in modern times that the major tone should be below the minor.

The Greeks had four modes or scales, the Dorian, the Phrygian, the Lydian, and the Mito-Lydian. The Dorian was set in the key of F natural, and the rest were distinguished by analogous differences.

The ancient Greeks were passionately fond of music, and elaborate treatises were written by them on the science and art. They did not understand harmony, and Aristotle (384 B.C.) speaks of the only chorus singing known as that of men singing a melody an eighth lower than it was sung by boys, which of course would be unison. Music was employed at Athens by wandering epic minstrels; it was also common in religious ceremonies, and to regulate the movements of the army. It formed part of the drama. We are told that Æschylus, the father of tragedy, composed the music for his own dramas and that Sophocles accompanied on the lyre the performance of one of his plays. Examples of ancient Greek music have been preserved. One fragment contains 6 lines of a chorus in the 'Orestes' of Euripides. Two hymns to Apollo, composed in the 2d century B.C., prize winners in musical contests, were discovered at Delphi in 1893 and have been published in modern form by Novello of London and New York. In 1899 a concert of ancient Greek music was given at Bremen, Germany, and examples are frequently included in programs of historical music. (See MODE; TEMPERAMENT). Consult Ambros, 'Geschichte der Musik' (Leipzig 1888); Crusius, O., 'Die delphischen Hymen' (Göttingen 1894); Gevaert, 'La musique de l'antiquité' (Ghent 1875), a standard work; 'La mélopée' (1895–96); Jan, K. von, 'Musici Scriptores' (Leipzig 1895); Johnson, 'Musical Pitch and the Measurement of Intervals among the Ancient Greeks' (Baltimore 1896); Monro, 'The Modes of Ancient Greek Music' (Oxford 1894); Reinach and Weil (in the *Bulletin de Correspondence Hellénique*, Paris 1894–95); Romagnoli, E., 'La musica greca' (Rome 1905).

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GREEK MYTHOLOGY. Mythology includes both those explanations which the imagination of man, primitive or civilized, has devised to account for natural phenomena and for the relations between the various parts of the universe, and also a wide range of other tales, probably invented solely to please the narrator and his audience. Both classes of stories frequently deal with powers superior to man so that in ordinary speech, mythology is generally understood to mean tales with regard to superhuman beings.

It is natural for man to refer whatever he thinks strange or marvelous to beings more powerful than himself, who have a superior control over both animate and inanimate worlds; between these two realms, however, simple man knows no distinction; all nature is animate to him. In classical antiquity, as in modern times, many theories and explanations of the origin of myths were offered. Since myths are often of immemorial antiquity, and therefore may contain many elements which seem crude and repulsive to men of an enlightened age, it frequently comes to pass that the rude tales about the gods are felt to conflict with the more advanced religious beliefs, so that it is necessary to explain the myths in some reconciling fashion, or to reject them altogether; the latter course is not easy, for nothing is more deeply rooted in the minds of a people than its mythology. In the 6th century B.C. the bolder thinkers among the Greeks began openly to protest against the epic stories concerning the gods. Xenophanes of Colophon (fl. 540–500 B.C.) declared that «Homer and Hesiod have imputed to the gods all that is shame among men.» On the other hand defenders of the poets, like Theagnes of Rhegium (fl. c. 525 B.C.), maintained that there was a deeper meaning in their works than that which lay on the surface; that the gods represented elements of nature or mental powers of man. So Athene was wisdom; Ares, folly; Hermes, reason; Leto, forgetfulness; Apollo, fire; Poseidon, water; Hera, air; and so forth. Thus arose the school of allegorical interpretation, which has had an influence down to the present time. At the end of the 4th century before our era, Euhemerus offered a rationalizing explanation of myths in his 'Sacred History,' where he set forth the view that the gods were only mortals who by their deeds had won high renown.

Views of Scholars.—Among modern mythologists three schools deserve mention; the philological, the animistic, and the anthropological or historical schools. The leader of the philological school was Max Müller, who sought by a comparative study of the Indo-European languages to determine the original meaning of the names of the gods, and so to arrive at a knowledge of their original functions. This method failed, in part because it is impossible in many cases to find etymologies upon which scholars agree, and above all because, even if general agreement were attained, the etymologies would prove nothing. The myths have had too long a life, and have suffered too many accretions and modifications, to yield their meaning to etymology.

Herbert Spencer and E. B. Taylor were the chief exponents of the animistic views, according to which man endows each phenomenon with personality, with an anima, which is its cause, and attributes to the phenomena of nature activities which properly belong to men or to animals. All religion, according to Spencer, begins with the worship of ghosts. There is undoubtedly much truth in the views of the animistic school, but on the whole their explanations are inadequate and incomplete.

The anthropological or historical school is the least ambitious, for it appreciates the impossibility of detecting in detail the varied impulses to which myths owe their births; but it recognizes that human minds, at any given stage of racial development, operate in very much the same ways, so that we find among peoples all over the world myths so similar that an earlier generation insisted that there must have been prehistoric borrowing even between very remote races. Some myths undoubtedly had their origin in the worship of dead ancestors, others in attempts to explain natural phenomena or social institutions, still others in ritual. Again many, if not most, myths have been recast, provided with new details, and variously manipulated at an advanced stage of civilization, as by the Greek poets and by even historians as well; finally many myths defy classification or satisfactory explanation.

The Myths of the Greeks.— Few peoples have given us a mythology so rich as that of the Greeks. For convenience we may distinguish between their cosmological myths, myths relating to superhuman beings of every grade, and tales of the after-world.

The earliest extant Greek literature shows that a long period of myth-making had preceded it. In Homer there is no elaborate cosmogony, because such did not suit the purpose of the poet, but it is evident that cosmological stories were familiar to him. Hesiod, on the other hand, offers an explanation of the derivation of the world from Chaos, and knows two dynasties, those of Uranus and Cronos, which had preceded that of Zeus. Literary fragments show us that there were many other cosmogonies, notably those of the Orphics. There were many myths of the creation, of plants, of animals, and of man; explanations of the origin of the arts and practices of civilized society, as in the tale of Prometheus; attempts to account for the origin of evil, as in the story of Pandora's fatal curiosity; and tales of the degeneration of the inhabitants of the world, the most famous of which is that set forth in Hesiod's account of The Five Ages, ranging from the Age of Gold through the Silver, the Bronze, and the Age of Heroes, to the present wicked Age of Iron. The Greeks, like many other peoples, had also a story of the great deluge, in which all perished save one mortal pair by whom the world was repeopled.

The myths of the greater gods often tell of their birth, rearing, relations, and characteristics in detailed fashion. In Homer Olympus, the home of the divinities of the upper air, is organized like an aristocratic mortal city, with Zeus as supreme king, his sister and consort, Hera, being far inferior to her lord in power. Zeus himself was the aboriginal god of the Hellenic stocks and universally regarded as the supreme divinity; although in the Homeric epics he is sometimes cheated and deceived by the other gods, still his supremacy is not questioned. Originally he seems to have been the bright sky, and therefore the god who controls all meteorological phenomena. It is impossible even to touch on the numerous myths that were told of him. He undoubtedly absorbed into himself numerous local divinities, so that in many parts of Greek lands the birthplace of Zeus was pointed out. In the most common version he was the son of Cronus and Rhea, who brought forth Zeus in the island of Crete, where, during his infancy, he was protected from his father by his attendants, the Couretes. His moral nature contained most complete contradictions; wholly faithless himself, he was also the god who guarded morals, protected oaths, humbled the proud, and punished evil doers. His supremacy was such that at times Greek religion rose almost to monotheism, although the step was never completely taken.

Hera likewise was a Pan-Hellenic divinity, but it is difficult to determine her original nature. In Homer she is represented as a good deal of a scold and, we may suspect, she was regarded somewhat as a comic figure; but in general the marriage relations between Zeus and Hera were good, as far as the goddess was concerned. Her powers were occasionally exerted in directing the phenomena of nature, but she was pre-eminently the protectress of women.

Athena, the virgin goddess, was regarded as the embodiment of wisdom. She was also a valiant fighter on the field of battle. The myth told how she sprang fully armed from the head of her father Zeus, and this tale furnished the central motif of the east pediment of the Parthenon. In her functions she was above all the goddess of practical life, presiding over handicraft of every sort.

Apollo, in the Homeric epics, is the god of archery and of music; but in the later period he was primarily the divinity of prophecy, with his chief seat at Delphi. He also had a shrine of great antiquity on the island of Delos, where, it was said, his mother, Leto, had given him birth. He also practised the healing art, but was second in this to Asclepios, whom post-Homeric legends made his son.

Apollo's sister, Artemis, was his counterpart in many ways, but far less prominent. She was a huntress, a goddess of all wild life, and she also practised the art of healing; women in child-birth were especially under her protection.

Ares, the god of war, was probably in his origin, a Thracian divinity. He is the embodiment of the wild rage of battle, and as such is represented by Homer as bawling and blustering, a character which he never lost in later story.

Aphrodite was the goddess of sexual love, whether legitimate or not. She had irresistible power over gods and men alike. Wedded to Hephestus, she herself had slight regard for her marriage vows, but had many amours, the most famous being those with Ares and with Anchises, the father of the hero of the 'Æneid.' There can be little doubt that Aphrodite came to Greek lands at some remote period from Phœnicia, for many of her functions and attributes were identical with those of Astarte or Ishtar. Aphrodite's attendant son, Eros, is not mentioned in Homer, but in Hesiod he appears associated with her, although he is there regarded as of independent origin.

The god of fire was Hephestos, the handicraftsman of Olympus, who wrought many wondrous works for gods and favored princes. He was the teacher of the Cyclops and the patron of smiths. He appears somewhat as the butt of the other Olympians, apparently because of his lameness. This affliction was due, according to one account, to the hasty act of his father Zeus, who in a fit of anger, seized him by the foot and threw him out of heaven. Another, perhaps older, tradition made him the illegitimate son of Hera, who believing him a weakling cast him out at his birth.

Poseidon, the brother of Zeus, had as his realm the sea and all other waters. As lord of the ocean he was also supporter of the earth, which he rocked by stirring his element. He was furthermore the creator of the first horse and hence the patron of horses and of horsemanship.

Hermes is the herald and messenger of the gods in the Homeric epics. For example he carries from Zeus to Calypso the order to let Ulysses go, and he escorts Priam safely to the Greek camp that he may ransom Hector's body. He also conducts the shades of the dead to Hades or brings them back to earth. Many myths deal with his character as the patron of thieves and the giver of wealth. It is said that in his earliest infancy he invented the lyre, which he presented to Apollo in atonement for the theft of 50 cattle. In his function as herald he became the god of oratory, and indeed of all speech; as protector of high roads, he was the god of the traveler and merchant; and he was also patron of athletic contests.

Hades, the second brother of Zeus, presided over the realm of the dead, but his cult never obtained any great prominence in Greece, and few tales were told of him in post-Homeric legends. Persephone became his bride.

Dionysus was the god of all life, especially of plant life. In Homer he has not yet been admitted to Olympus, but many myths are referred to showing the opposition which was offered to the establishment of his worship. In fact this god was of Thracian or Phrygian origin and only gradually made his way into Greece, being first domiciled at Athens possibly as late as the 8th century B.C. In a common myth Dionysus appears as the son of Zeus and a mortal, Semele. At his birth his mother was consumed by lightning but the babe was sewn into the thigh of Zeus, whence he was reborn to be reared by the nymphs on Mount Nisa. The functions of this divinity were varied. As a god of vegetation, under the name of Zagreus, he was said to have been torn in pieces by the Titans and then to have been revived; thus he became by his rebirth a warrant of human immortality, and as such played an important rôle in the Orphic religion. The spread of the worship of Dionysus across the seas is celebrated by the legend that Tyrrhenian pirates once seized the young god and attempted to bear him away in their ships, but he burst his bonds and, when his captors refused to believe him a god for the miracles he worked, he changed them all into dolphins. A later series of myths told of his travels to India. Out of the songs and dances in honor of Dionysus developed the dithyramb and both tragedy and comedy.

Demeter was principally the goddess of the tilled soil and especially the giver of grain to men; and since well being and good social order depend on agricultural prosperity, she became the giver of wealth and of laws. Persephone, who was obviously a parallel to Demeter, in myth was the latter's daughter and was stolen away by Hades to be his bride. Demeter wandered in the guise of an old woman over the earth mourning until she came to Eleusis, where she was kindly received by the king's daughters and established as nurse to the king's son. When she was discovered in her attempts to make the child immortal by repeated baptisms of fire, she revealed herself and ordered a temple to be bulit in her honor. Yet in her sorrow over her daughter she kept back the gifts of earth, so that men began to die, until Zeus commanded Hades to allow Persephone to return for two-thirds of the year to her mother. Then Demeter established her rites, the Eleusinian mysteries, which developed from an agricultural festival into one of the most potent Greek religious festivals.

Asclepios, the god of healing, in the epics is a mortal, but apparently he was originally a chthonic divinity possessing general oracular powers. The centre of his worship seems to have been Thessaly, whence his cult spread over Greek lands. Coming into conflict with Apollo at Delphi he became in myth the son of that god. In course of time his functions became specialized, and his shrines at Epidaurus and on the island of Cos became for centuries miracle centres to which great numbers of people resorted that they might sleep within the sacred precincts and in a vision learn the means by which their diseases could be cured, or that they might receive the benefit of a miracle directly.

Besides these greater gods there was a multitude of lesser divinities of sky, air, earth and water, not to speak of abstract gods, of whom mythology has much to tell; but it is impossible here to enter into this field.

There are also two great groups of historic myths which furnished many elements for epic and dramatic poetry — the Trojan and the Theban Cycles; the former concerns the fortunes of Troy from the time when King Dardanus established himself in the land where his descendant Ilos founded Ilium, through the causes and the course of the Trojan War to the return of the Greek heroes to their homes. The tale of Thebes deals with the fortunes of the house of Labdacus, with the stories of King Œdipus, the Seven against Thebes, and the Epigonoi. Other famous cycles deal with the labors of Heracles, the adventures of Theseus, the voyage of the Argo after the Golden Fleece and with the histories of Minos, king of Crete, and his sons, and of lesser heroes.

Greek mythology had far less to say of the lower world than of the upper. The realm of the dead was generally placed beneath the earth where Hades reigned with Queen Persephone. In Homer this other world is represented as a cheerless, unsubstantial place for all, where there is no system of rewards or punishments, save for three offenders who had sinned excessively against the gods; but in later literature we find the joys of Elysium and the tortures of Tartarus fully developed and used for moral purposes. Hesiod and Pindar give us the earliest references to the Islands of the Blest where those who have divine blood in their veins, or those who have remained true to the highest ideals throughout their lives, are to find eternal happiness.

There were tales also of descents to Hades by the living: The most famous were the descent of Orpheus to recover his lost Eurydice, and that of Heracles who carried off the watch-dog, Cerberus. Both these were celebrated in literature and art. See GREEK GODS; GREEK RELIGION.

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GREEK PHILOSOPHY, the various speculations of the ancient Greeks with regard to the origin of things. This is but a partial description of the intellectual efforts made by the keen and powerful minds of the ancient world to solve those problems which science nowadays is so eagerly investigating. The origin of Greek philosophy was the gradual disbelief that had seized men's minds as to the truth of the ancient poetical cosmogonies and antique mythologies of religion. Faith was dead and reason had awakened. In the 7th century before our era, in the flourishing city of Miletus, capital of the Ionian colony, the first Greek philosopher propounded the question which is still being put, What is the basic substratum of all phenomena? In our own days Huxley called it protoplasm; Herbert Spencer said it was force. Thales of Miletus (636 B.C.) declared it was water, which to him seemed to permeate and give life to all things. Thales was the first of the Greek physicists, or materialists, and was considered one of the Seven Wise Men of Greece. He was the founder of the Ionian School of Philosophy. He was succeeded in the long line of philosophical inquirers by Anaximenes (529 B.C.): who looking for the first element, the first cause, found it in air. Air was universal and must be the parent of all things. It was the breath of life and must therefore be the source of it. Diogenes of Appollonia (460 B.C.) fixed upon a higher notion as the first cause of things. He saw the ruling race of mankind prevailed over nature by their intelligence. He decided that intelligence was the cause and foundation of all things. In these speculations as to the nature of the universe and its origin we come upon two remarkable men, Anaximander of Miletus (610 B.C.) and Pythagoras, who invented the word philosophy. The former taught that all existence came from the infinite — a vague term, which did not mean the infinite intelligence but the infinite existence. Pythagoras said that number was the first thing, from which all else proceeded — a metaphysical abstraction, which almost defies analysis. Aristotle says the Pythagoreans «taught that number was the beginning of things, the cause of their material existence, and of their modifications and different states.»

The school of Eleatics is chiefly represented by the poet Xenophanes (620 B.C.). His philosophic creed is thus described by Aristotle: «Casting his eyes upward at the immensity of heaven, he declared that *The One* was God.» Reason and imagination led this thinker to become at once a Monotheist and a Pantheist. Parmenides who was born (536 B.C.) at Elea, a city which gave its name to Eleatics, was the first to make the great distinction between truth and opinion, between the deductions of reason and the impression of sense. He made being the basis of things, for non-being was impossible — a discovery which at that stage in philosophical speculation was of great importance. Zeno, another Eleatic, born 500 B.C., who was the inventor of logic, was persecuted and put to death for free-thinking and was a follower and disciple of Parmenides. Plato says that the master proved the existence of the one; the disciple established the non-existence of the many. He preserved his master's distinction between truth and opinion. «Your senses,» he would say, «tell you that there are many things existing; reason avers that there is but one.»

A contemporary of Zeno was a man who began at Ephesus those speculations as to the origin of the universe to which as preliminary he added a theory on the origin of knowledge. This was Heraclitus (503 B.C.). He was a disciple of Xenophanes and taught that fire is the origin of everything, and there is no existence, but only change; things cannot be said to be, but only to be becoming; processes and not states formed the mode of existence. We cannot know or name anything with truth, for as we look at it, it changes, and is something different from what we thought it.

Anaxagoras came from Clazomenæ to Athens just when the age of Pericles was dawning; he had indeed Pericles, Euripides and Socrates as his pupils. He attacked the patriotic religion of the proud city and was banished to Lampsacus. He thought that all sense — knowledge — was delusive until corrected by reason. He believed that intelligence was the creative and regulating influence of the universe. Things as they are were brought about by the concourse of infinite atoms; but these atoms were of all sorts, and that like was united to like in an infinite series of movement and combination; gold by the union of gold atoms that had existed from eternity, fires from fire atoms, air from atoms of air. These atoms were the famous homœomeriæ spoken of and condemned by Aristotle. Empedocles (444 B.C.) was of the great city of Agrigentum; in his views of knowledge he belonged to the Eleatics and maintained that the senses were fallible, while reason was a sure guide to truth. He was a poet and declaimed against anthropomorphic ideas of deity. He gathered in one the doctrines of the Ionian physicists declaring the primary elements were four, namely, earth, air, fire and water. Love was the formative principle of things, hate the dissolver and destroyer. One was harmony, the other discord, and God is the One, «a sphere fixed in the bosom of harmony, rejoicing in calm rest.»

Democritus of Abdera (460 B.C.) was a rich man who entertained Xerxes at his house. He went one step further than Anaxagoras and almost entered the circle of our modern science by teaching the atomic theory, namely that everything in the world is the result of a fortuitous concourse of atoms, all of the same substance, but making various things through the various forms they take in uniting. Color, sweetness, cold, are the result not of substances essentially differing; all is form.

All attempts had so far failed to solve the problems of the material world and of human knowledge. Many theories were put forth, none were universially accepted, although they were each discussed. This brought the Sophists on to the stage of philosophy — men who taught the arts of discussion, not of investigation. One of the greatest of them was Protagoras. He was a disciple of Democritus and taught that opinion was everything, "Man, the individual man, each for himself, is the measure of all things." The Sophists were the first skeptics, but a new epoch rose with Socrates (469 B.C.). He was the most remarkable man in all the Greek world; for his love of disputation he was classed by some with the Sophists, for his ridicule of traditional views in religion and physics, he was condemned to death — yet he succeeded in substituting morals for physics as as the subject of philosophy. He first gave to philosophical methods the definition and the inductive argument, or reasoning by analogy. One of his disciples, Aristippus of Cyrene, while he followed the method of his master, founded the Cyrenaic school which taught that pleasure was the criterion of the true: Socrates had taught that the good as judged by the individual conscience was that criterion. Then followed the Cynics, under Antisthenes who went to the opposite extreme to Aristippus, who became an ostentatious ascetic, and in this was followed by Diogenes of Sinope, who made his home in a cask or tun, and tried to set the example of a rugged virtue, which is misanthropic, but triumphant over bodily appetite. It was left to Plato to exhibit the complete adoption and application of the Socratic method. He believed that in each man resided the power of detecting the truth, from having seen the perfection of things, in an ideal world during a previous state of existence; he could judge of the good and the beautiful here from his memory of what their perfect archetypes were. His voluminous writings enable us to judge both of his ethical and political system, but they both fail in practicality. His most famous pupil was Aristotle (384 B.C.), a man of encyclopedic mind, the first scientific observer, the inventor of the syllogism. Plato was an idealist and a rationalist; Aristotle a materialist and an empiric. The one trusted to reason, the other to experience. Aristotle always argued against the ideal theory of his master and deduced his conclusions from things as he saw them. He invented grammar as well as logic and was in himself an epitome of the philosophic learning of his predecessors. But by reasoning from experience he had opened the way for the skeptics, of whom the first was Pyrrho, who taught that there is no criterion of truth. Phenomena are mere appearances, how can we prove they are anything else? This was what in modern times is called agnosticism, for we cannot prove and therefore cannot know the truth of anything we see. But after this suicide of philosophy in the school of Pyrrho, she revived again as a moral mentor in the person of Epicurus, of Sanios (342 B.C.). He taught the highest good is pleasure; this is the moral end of existence. He was controverted by the Stoics. Zeno was their leader, a man of stern unbending character and abstemious life, whose aim was to show that virtue consisted in manhood and manhood in the power to endure hardness and to despise the body. Skepticism, indifference, sensuality and epicurean softness were not to be combated by the vague dreams of Plato or the cumbrous system of Aristotle. The Stoic attempted to meet the growing decadence by an exactly opposite self-denial and impassive reserve. But Stoicism was egotistic; its aim was the repression of feeling, it was apathy, death in life. The last struggle of Greek philosophy to dominate the mind of society was witnessed in the rise of the New Platonists and their New Academy. Carneades (213 B.C.) was their most illustrious representative, and he was the type of a school that took up the doctrines of Plato, expanded and enlarged them until the time when Christianity appeared and faith, not reason, as in the old days 700 years before, dominated the world of opinion. See PHILOSOPHY, HISTORY OF.

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GREEK RELIGION. The ideas of a perfect god, revelation, creeds, dogmas, conscience, divine love, etc., were not present in the Greek religion. The Greeks believed in a personal god, who was interested in the welfare of certain men, and these men longed for the protection and sympathy of that god, to whom they prayed and sacrificed. Shrines of these various deities were everywhere. Religious practices were numerous; but religion rested lightly on men's shoulders. Religious rites and festivals were most frequently occasions of joy.

Zeus was the father, the paternal ruler. The other gods were mere ministers in the divine government of the world. To the Greeks, man was like god, and god like man. So they could enter into definite relations with their gods; they recognized that communion underlies worship. The myths about the gods were believed to be true — at least by the vast majority — just as sincerely as a modern Christian child believes in Santa Claus. But the myth was never an article of creed; it was kept free from the influence of theology. Greek religion as such was guiltless of system and wholly devoid of method. For worship the gods had definite shrines where they had specific names. Religion and morality were separate and distinct, though they tended later to become united. The god of each shrine was treated as if he were independent of the other gods. There were as many religions as cities; and the cult of a city made no appeal to an outsider. Each god was worshipped independently — as if the other gods did not exist, just as in some Catholic countries one saint is worshipped while others are apparently forgotten. The temples and shrines were supervised by the state; priests were appointed and temples built by the people as a whole; and religious law was administered in courts established and maintained by the authority of the state. Greek religion remained to the end an untheological religion; the only authority for ritual was the tradition of each particular shrine, handed down from remote antiquity. From the interchange of ideas there arose two types of sacrifice, one a joyous festival in honor of the god, the other a solemn rite to appease an angry deity. But everybody was free to think of the gods as he chose. The comic poet, Aristophanes, could make fun of them — that was immaterial so long as the public worship continued undisturbed.

Greek Worship.— The Greeks did not worship physical objects. Zeus was father of gods and men; rain came from Zeus; the thunderbolt was his weapon; his home was in Olympus. Dionysus was the god of wine, Poseidon of the sea. Nevertheless, Dionysus was a human god, visiting one place after another; Poseidon was a lover of horses and fond of the battlefield; Apollo was the prophet who revealed to men the divine will, and he was the great musician, the healer of disease and the god of shepherds; Aphrodite was the most human of all the gods, the spirit in whom was manifested human love as a fundamental principle of the universe. The joy of the spring is poetry for us; for the Greek it was the joy of that community of nature of which he himself was a part. The religion of the Greeks was not a worship of nature, but a worship of spirits in nature. The gods differed from man only in degree. In Homer they exhibit the same passions as men: Love, hate, jealousy, revenge, guile; they are greater only in might. Leto is the mother proud of her children, Hera the queenly wife, Persephone the gentle daughter; Poseidon granted safety to sailors; Athena and Hephæstus taught men the arts and crafts; Demeter showed them how to cultivate grain.

The relation of the gods to each other was similar to the relation which exists between members of a council. That the gods belonged in the same society with men working together toward a common goal — this was the conception of the Greeks regarding the principle of divine government in the world. And there were evolutions and revolutions among the gods as among men; earth had its counterpart in heaven.

The Gods and Men.— Our religion is much more profound than the Greek; but the latter was much broader than ours, for it peopled the glens of the mountains and the waves of the sea with an overflowing life human in its forms. Greek religion embodied in art all that stirs the religious feelings of men: the ocean and the river, the rock and the forest, the sun in its splendor, the moon in its gentle romance; and this religious feeling was with the Greek all the time, not merely at church service, prayer-meeting or revivals. The symposium began and ended with prayer. Even gymnastic contests and horse-racing came within the pale of religion. Every side of man found expression in religion. Political assemblies began with worship. Marriage and the rearing of children were under the protection of the gods. If men wanted bread, they worshipped Demeter; if wine, Dionysus; health, Asclepios; care for sheep, Apollo, Pan or Hermes. If they desired to know the future, they consulted oracles. The bringing of votive offerings to the gods was in the same spirit as the bringing of tribute to human rulers. The procession at the festivals was like the triumphal procession with which all students of history are familiar. The use of the common meal as a form of worship is not unlike the Lord's Supper, although it was not the sacredness of food that was emphasized so much as the vital bond of union between the god and his worshippers.

When a colony was to be founded, the god at Delphi would be consulted; unfavorable omens would delay a battle; the sick looked to divine guidance for a cure; a sneeze showed the approval of the gods in some undertaking; a dream would deter or encourage.

The gods sometimes revealed themselves to men; but "not to all men do the gods appear visibly" ('Odyssey,' III, 375 f). Zeus and Hera, however, remain on Olympus. Iris and Hermes are messengers to men; Apollo and Athena appear occasionally to carry out their plans or the plans of Zeus. When the gods appear in visible presence to men, they usually assume the guise of some particular individual. Thus Aphrodite takes on the form of an old woman on one occasion, Poseidon of Calchas, Athena of Mentor ('Odyssey'). Sometimes the gods came directly to earth *in propria persona:* Aphrodite in the 'Iliad,' is wounded by Diomedes, Ares dazed by a blow from Athena.

Learning the Will of the Gods.— Signs of nature were more important than those obtained by divination. In the 'Iliad,' thunder revealed the will of Zeus. Lightning on the right indicated the favor of the king of gods. An eclipse of the moon so affected Nicias that he would not withdraw his army before Syracuse. At Athens the assembly would adjourn if rain signified that Zeus was unpropitious. Only the superstitious, however, paid much attention to such signs. The science of astrology had practically no adherents in Greece. In Homer, the chief method of learning the will of the gods was the observance of the flight of birds: The eagle of Zeus, the hawk of Apollo, the heron flying in the night. Prometheus claimed that he taught men divination; "The animosities, consortings and attachments of birds; and the smooth surface of the viscera and what hue the gall must have for the gods' pleasure and the mottled symmetry of the liver lobe; and the thigh bones, in fat enwrapped, and the long chine I burned and initiated mortals into the mysteries of an occult art." (Æschylus, 'Prometheus,' 492 ff.).

The eagle, the vulture and the crow were particularly significant. In the later and greater days of Greece omens from birds became less important. The chance word, too, was often regarded as a sign. In sacrifice, if the victim comes unwillingly to the altar, if the viscera are deformed or discolored, if the fire does not burn properly, the gods are displeased. If an animal dies on the way to the altar, some terrible calamity impends. The character of the liver was considered most significant.

> "Hephaestus's flame
> Shone not from out the offering; but there oozed
> Upon the ashes, trickling from the bones,
> A moisture, and it smouldered, and it spat,
> And, lo! the gall was scattered to the air,
> And forth from out the fat that wrapped them round
> The thigh bones fell." (Sophocles, 'Antigone,' 1006 f.)

The position of the seer in the army was only less important than that of the general. Dreams that come through the gates of ivory are deceitful, those that pass through the gates of polished horn are true. Achilles dreamed that Patroclus urged the burial of his body. In Homer dreams are sent by the greater gods directly. In Homer, too, the seer is a man inspired by the gods. It is the favor of the god that usually grants this gift. The seer's chief task is to interpret signs, dreams and omens. In later times, the presence of the seer in the army was important, because some official interpreter of the divine will lent greater sanction. According to Homer, the divine gift runs in families. The kind of inspiration known as "possessed by the god" was recognized, but found small place in actual practice. The "Chresmologist," who possessed a collection of ancient oracles which it was his business to interpret, played the part of the prophet. Sometimes these collections belonged to the state. The seat of the chief oracles were Dodona, Ammon, Branchidæ, Colophon, Lebadeia, Oropus, and chief of all, Delphi. At Dodona the signs were from the rustling leaves of the sacred oak. At Delphi the priestess sat on a tripod and breathed the exhalations issuing from a chasm beneath till the god inspired her to answer the question. After bathing in the water of Castalia and drinking from the spring Cassotis, she chewed leaves of the laurel and mounted the tripod. An official put the question to the raving priestess and then transcribed her answer in hexameter verse, returning it sealed to the person who was consulting the oracle. Over 200 answers have been preserved, but the authenticity of most of them may be doubted. Herodotus, however, quotes about 50. Many of the answers were vague, sometimes susceptible of opposite meanings, but in general they stood for progress in ethics and religion. The church fathers contended that the inspiration of the Pythian priestess was real, but the working of evil spirits. Van Dale (1700) explained the oracles as the result of deception deliberately practiced by the priests. But the Greeks would not have submitted to such deliberate imposition for so many centuries. The priests seem to have been inspired by high ideals and a genuine desire for the welfare of Greece. Actual corruption was seldom proved, and, when discovered, was punished by the Delphians themselves. Delphi was the "Vatican of antiquity," a holy city, "a centre of moral teaching and an authoritative guide in matters of politics as well as in matters of religion."

Belief and Worship.— Mountain tops suggested the presence of Zeus; caverns, gods from the world below. The gods of Homer dwell on Olympus; but each deity had also a favorite spot on earth. A dense grove might be the dwelling place of a god. In the early period the god was worshipped beside the altar in the open air; later the deity had an abode (the temple). Certain properties, from which an income was derived, belonged to the god. He owned and leased houses, factories, sheep, poultry or rights in fishing. The management and collection of rentals was in the hands of the priest. There were 200 shrines in Athens alone. Athena was worshipped at each of her various seats in a different aspect of her nature. The temple was not a place for congregational worship. Some symbol or image marked the god's presence. The statue itself was not worshipped, but the god himself. To remove forcibly an innocent person from the altar to which he had fled for refuge was sacrilege.

The Greeks had no Sabbath days; but in each state were religious festivals which were celebrated at regular intervals. The Athenians set aside more than 50 days each year for the worship of the gods. Certain days in each month were sacred to some particular deity. The priest was not a holy man, nor was it requisite that he should have a special education for his office. Physical perfection was necessary to please the god. Sometimes the right to a priesthood was sold to the highest bidder. In Athens, the priest was often selected by lot. No elaborate consecration was necessary.

The Greeks prayed to the gods, for "from the gods came all good things." A prayer was offered when the youths entered the athletic contests or went hunting, and especially when they set out for war. The farmer prayed when he began to plow. Pericles is said never to have begun an oration without a prayer that he might "utter no unfitting word." Women generally prayed to Demeter and Persephone. The votive offering was a gift in acknowledgment of some blessing. In later times it was either a thank-offering or the payment of a vow. Men healed from sickness would express their gratitude by dedicating an image to Asclepios; the victor in a contest by dedicating the wreath he had won, or a statue. The temple of Apollo on the island of Delos possessed 1,600 vessels of gold and silver that had been dedicated as votive offerings.

For a propitiatory sacrifice a black animal was ordinarily selected. Its head was bent to the earth, the throat cut, and the blood allowed to soak into the ground. No libations were poured.

In the Eleusinian Mysteries was taught the belief in a real life after death. "Thrice blessed they of men who see these mystic rites before they go to Hades' realm" (Sophocles). All Greeks believed in the continued existence of the soul; but those initiated into the Eleusinian mysteries felt that they would have the favor of Persephone, queen of the lower world. These mysteries were probably the most important form of worship in ancient Greece.

The Greeks conceived the word as the result of a development, in which the more complex forms grew out of simpler forms. The gods themselves were descended from Heaven and Earth. Zeus was the god of the family. The stranger and the suppliant were under his protection. Hera, his wife, as goddess of marriage, was worshipped by women with initiative rites. Athena was the goddess of war. Under the name of Ergane she endowed women with skill in weaving and embroidering. The olive was her best gift to the Athenians. At the Panathenæic festival she was represented as the patron goddess of Athens, of its martial glory, its technical skill in manufacture and its political wisdom. Athena and Athens, the goddess and the city, were practically one. The man who died in battle for the city died in the service of the goddess. Unless one bears in mind the power which the city exercised over the imagination of the citizen, the most important strain in Greek religion and religious art will not be recognized. Apollo, the embodiment of youth, was worshipped by boys on arriving at maturity. The Delphic Appollo was patron of prophecy, music and the healing art. To Artemis women prayed for help in childbirth. She was the only god to whom wild beasts were ever sacrificed. Hunters prayed for her blessing. Of all the sea gods, Poseidon was the only one who had a seat in the Olympian council. The usual victim at his altar was the bull. The rearing of horses was his special care. The heavenly bodies were not worshipped in Greece, except in Rhodes the sun (Helios) was the chief deity. Demeter, originally «mother-earth,» was primarily the goddess of grain. In the Eleusinian worship she and her daughter Persephone, were also goddesses of souls. Dionysus was the god of wine, and also of returning vegetation. Hermes was the god of flocks. His worship was especially prominent in Arcadia, where he was born, and in Thrace. He was also the god of trade and of gain; and he was the guide of souls to Hades. Pan the son of Hermes, was another Arcadian god of shepherds and goatherds. He himself had goats' legs and beard. His haunts were the crags and wooded glens, and he loved the springs and the nymphs that haunted them, as well as the dances and music of the goatherd. After the «panic» terror, by which Pan aided the Athenians at Marathon and Salamis, he was worshipped in a grotto on the northwestern side of the Acropolis. Aphrodite was honored as the goddess of human love and of marriage. To her women prayed for all feminine charms. Ares was the god of war, Hephaestus the god of fire and the smith's art; Prometheus was honored in Attica with Hephaetus as the giver of fire and of civilization made possible by this gift. Hestia was worshipped in every household as the goddess of the home and of family life. Asclepios, Apollo's son, was the god of healing. Eileithyia presided over childbirth. Persephone was the gentle daughter of Demeter, Artemis the virgin loving the wildness of nature. (For Dionysus see Greek Drama). Each god is prominent as a personality because he personifies clearly some human relation. The principle of beauty largely determined Greek thought as to the character of the gods. «The unity and the symmetry of their personality, the graciousness of their nature, the kindly spirit of their relations to each other and to men are a reflection of that aesthetic ideal which was so dominant in Greek life.» The Greek did not judge human life by stern moral standards. With all its joyousness a strong undercurrent of sadness runs through Greek literature. Death is hateful. Evil is man's worst enemy. The «soul» is simply what goes to Hades. In Homer it is a shadow, a form without substance, but in later Greek the soul is often regarded as immortal. The souls of the dead, having power to bless or curse, are worshipped. Odysseus visits Hades (Odyssey XI) and he sees the souls coming and going in troops, flitting about and squeaking like bats. When they drink the blood of the sacrifice, they regain consciousness. The Athenian point of view is higher. Socrates believes that death is either a dreamless sleep or the introduction of the soul to a higher form of life. Athletic games were held in honor of the dead in early times. The body must not be neglected. In war the victors bury their enemies as well as their friends. Both interment and cremation were practiced from early times. Objects used by the dead were placed beside the corpse. The mourners held a memorial banquet at which the soul of the dead was conceived to be present as host. Hades was the «Unseen» god. His house was dark and gloomy. The «Islands of the Blest» appear first in the 'Odyssey.' Hades' realm was a counterpart of the realm of Zeus, a shadowy copy of life on earth.

In Homer the Erinyes enforced the right of strangers and guarded the rights of the first-born. Later they were especially the avengers of crime against the family.

Orphic theology, based on Hesiod and his successors, taught the essential unity of the gods and the presence of the divine nature in the human soul. The initiations were rites adopted from Crete and Phrygia. Eating the raw flesh of a bull symbolized the union of the worshipper's soul with the god of all life. Clay and pitch were used to absorb the taint of evil from the body. All contact with death was forbidden — hence the practice of abstention from animal food. Beans were tabooed, woolen garments not worn. But all these rules of avoidance never developed into a real asceticism. In many places the practices continued until Greek religion yielded to Christianity.

Pythagoras taught that the soul was the antithesis of the body, and that the soul returned to the gods as the ultimate goal.

Temperance, purity, truth, were the expression of social demands, not the outgrowth of religion. But morality and religion came into close contact at many points, especially in the minds of some great thinkers; but in the minds of the people they never blended.

The state directed and controlled religion.

Religion and the State.— Where the religious unit was larger than the political unit, a new unit was formed to carry on the interstate worship. There was no «church» apart from the family, tribe, nation or amphictyony. This checked individualism in religion. Piety was a civic duty. The sense of personal sin, faith in a god who cares for the individual, love for a god, these could not develop under such conditions. Religion could not be a selfish matter, for it benefited the state, not the individual — a religion valid all the time, not simply on Sunday. There was no bible, no theology, no preachers. Sound morality was a social rather than a religious virtue. The priest was not a clergyman; he had no parish, no duty to impart moral instruction — in short, he was a public officer. Celibacy, as a rule, was not required of either sex. The priests had servants who were paid by the state, or from endowments, to sweep the temple, act as beadles, make proclamations or play flute accompaniments. A burnt sacrifice is made at an altar outside the building. In the country an altar could be built of turf or rough stones. In the city it was of marble. If in front of a temple, the statue on the inside looks toward the altar on the outside. The participants in the sacrifice approach in festal attire. They wear wreaths on their heads. A brand is taken from the fire and dipped in water with which the company is sprinkled. Prayers are then offered with uplifted head and hands. Sometimes an ode specially composed for the occasion is chanted. The victim is then led to the altar. If it does not struggle back, the sign is good. Barley-grains are scattered on its head, and then the throat cut so that the blood spurts into the flame, whereupon the company raise a jubliant cry. Then the animal is deftly skinned and carved, and the thigh-bones, covered with fat, are burned in the fire so that the savor mounts to Heaven. The rest of the meat becomes a feast for the participants. The sacrifice is accompanied by music from the flute, while prognostications are drawn from the way in which the fire and smoke ascend, and also from an examination of the entrails of the victim.

The state did not go out of its way to inquire into one's private beliefs; but one must not meddle with the beliefs of his neighbors by preaching atheism or new divinities, nor damage sacred property, nor behave in an unseemly way at religious ceremonies. The charges against Protagoras and Socrates were only a use of legal machinery to get rid of men whose conduct and influence had rendered them unpopular and seemed to threaten the character of the community.

Apollo, rather than Zeus, was governor of Olympus. The only real discipline submitted to even momentarily by all the gods in Greece emanated from Delphi. As Dyer says ('The Gods of Greece'), «Zeus was a king among gods, who reigned but governed not. His Premier was the Delphic god.» The truth of this statement is reflected throughout the 'Eumenedes' of Æschylus and the 'King Œdipus of Sophocles. (For the religion of the tragic poets see ÆSCHYLUS, SOPHOCLES, EURIPIDES). Apollo is the highest ideal of character in the Greek pantheon. The purer aspects of Greek ritual have a counterpart in the most holy Christian places. «It was no fanciful parallel which the Christian author of 'Christus patiens' drew between the yearly passion and yearly resurrection of Dionysus in ancient ritual and that passion and resurrection which Christians yearly celebrate today» (Dyer). See GREEK GODS; GREEK MYTHOLOGY.

JOSEPH E. HARRY.

GREEK SOCIAL LIFE. The Athenian did not turn night into day, but rose at dawn and went early to bed. He made his calls immediately after he took his first meal, which was literally a «breakfast,» and nothing more, consisting of a few mouthfuls of bread dipped in wine. At noonday he took a substantial, but not an elaborate meal, for the Athenian was not a glutton. His dress was simple, although all did not dress exactly in the same style or color. There was little change of fashion either for men or women through all Greek history. The male attire consisted of two articles — tunic and mantle. These were oblong, of woolen material (generally), draped around the body. One or both were worn according to taste, occupation, or the weather. Some wore white, others purple, red, green or black. Yellow was reserved for the women. Often these tunics and mantles were adorned with colored borders, embroidery or stripes. Hats were practically unknown, for they were unnecessary, except when a journey was to be undertaken, when a cap or a hat with a brim was worn. The head was well protected by a fine covering of hair, and, we may rest assured, there were fewer baldheads than in modern times. In the house the men went barefoot, or wore slippers; outside each could do as he liked. Socrates regularly went barefoot, even in winter. The simplest foot covering was the sandal, which was nothing more than a leather sole held to the foot by a strap, which passed between the big toe and the next and was fastened to other straps running along the foot and down the heel. But the hunter and the traveler wore boots.

When the Athenian went out in the morning, he usually carried a cane, and wore at least one seal ring, which was for both use and ornament. If he could afford it, he was accompanied by two slaves, to carry his belongings or to run errands. If he was poor, he had to be content with one slave. When he met an acquaintance, he did not bow and shake hands, for to do the former was considered beneath his dignity as a citizen of a free republic, while the latter was reserved for making solemn pledges, or as a demonstrative welcome after a long separation. The usual greeting was «Hail!» or «Glad to see you,» or «I hope you are well.»

The first place visited was usually the agora, or market. Here the Athenian ladies who could afford to stay at home never appeared. The buying was done by the husband or by slaves. Poor women, however, stood behind the stalls dealing chiefly in bread, figs, vegetables and flowers. The Athenians did not eat much meat, but they had a preference for fish, and the fishmarket was generally crowded when a fresh catch came in. The marketing time was from 9 till 12. During business hours every sociable Athenian spent some of his time in the agora. Often the business that called them there was to employ a professional caterer for a dinner they proposed to give. After this duty was performed each citizen might visit his banker; and between 10 and 11 he would be ready for a turn in the colonnades, or a visit to the barber shop, or the perfumer's shop, or he might even repair to the shoemaker's, where he knew he would be sure to meet some friends with whom he could discuss the latest news, political questions, or even purely abstract questions, for, as Saint Paul said, the Athenian spent his time in trying to find out some new thing.

The barber trimmed his hair or beard, let him look at himself in a bronze mirror, and then gave him a manicure — for the Athenians were extremely fastidious about the appearance of their hands, as well as the hair and beard. The hair was never cut short, nor allowed to grow long. A closely cropped head was a sure sign of a slave, or a professional athlete, or mayhap a Stoic or Cynic, who tried to flout fashion and public opinion. Sometimes the professional philosopher would wear a long and untrimmed beard for the same reason. Shaving was unusual down to the Macedonian conquest, but no Greek ever wore simply a moustache without a beard. This was a mark of barbarism. The razor used was in shape somewhat like the moon just before it is half full.

From the barber shop your Athenian goes home to lunch. He has no watch to tell him the time of day, but he was accustomed to gauge the time by the sun far better than we. Besides, there was no hurry, for a few minutes late or early made no difference. There was a public sun-dial; and in the better houses a large hour glass filled with water instead of sand. There was no formality about social intercourse. If an Athenian happened to meet a friend on his way home, he would extend an oral invitation to come to the dinner he proposed to give that evening or the next; or he would send a slave to carry, not a written note, but a verbal invitation. His *déjeuner* was taken under the covered portico of the court. Then he rested a while, and perhaps read a book; but he did not sleep. Refreshed, he would walk to one of the three public gymnasia: The Lyceum, Cynosarges or Academy. The gymnasia were open only to men over 18. If he was too old to engage in the exercises, he might look on, or devote himself to discussion with his comrades. There was an abundance of disputants, jests, sarcastic wit, story telling and sociable conversation. After spending a couple of hours here he would take a bath. Public baths were near every gymnasium. His slave would have his oil-flask and flesh-scraper ready for him after the bath, for every Athenian anointed himself with olive oil, mixed with perfume, and scraped his body with a strigil. When he reached home, he finds that everything is ready for the dinner. His wife and daughters will not put in appearance; they must remain in the *gynaeconitis*, or women's apartment, for the company is composed of men, whose conversation is above the women's comprehension. The dinner is for social enjoyment — the food is a secondary consideration. The Athenian had a special abhorrence of «swinishness»; his dinner had to be replete with wit, wisdom, jest, anecdote; the main thing was lively society, conversation, mutual entertainment. Couches were brought in for the diners to recline on. These ordinarily accommodated two guests. No objections were raised by the host to a friend's bringing an intimate acquaintance along uninvited. This practice, so impractical in modern times, brought no trouble or inconvenience to an Athenian host, for there was no long table with a limited supply of chairs, no knives and forks, and the quantity of food mattered little. When the guests entered, slaves removed their sandals and poured scented water or wine over their feet, whereupon the diners reclined on their left side. Then servants poured water over their hands. Small tables were brought in, one of which was placed before each couch. The food was taken up by the fingers, which were assisted by pieces of hollowed out bread when soft food or gravies had to be dealt with. There were no napkins, in lieu of which the fingers were wiped by pieces of soft bread. These scraps were then thrown to the dogs. There was no carpet on the floor. Shells, bones and peelings were thrown down and swept out by the servants later. The first half of the dinner consisted of substantials: fish, birds, eels, but very little meat (beef, lamb, pork) and vegetables. Water was then carried around for the guests to wash their hands, the tables taken out, the floor swept, and a song sung to the accompaniment of flutes. After a libation had been poured to the good genius the real symposium began. New tables were brought in. On these were fruits, salted almonds, cheese and salt. Another libation is now poured, after which the guests proceed to elect a symposiarch or president, who determines how much wine is to be drunk, and what the mixture shall be. Usually this was two parts water to one of wine. They had no tea or coffee, only water and wine to drink. Decided disapproval was cast upon drunkenness. Moderation was the Greek motto. After the slaves mix the wine in a handsome bowl, they dip it out in beautiful jugs, or pitchers, and pour it out into handsome goblets with which each guest is supplied. Adventitious aids to the entertainment such as flute girls, dancing girls, buffoons and acrobats, were usually discarded for conversation pure and simple. But the lyre would be passed around and each guest would be expected to sing some famous song from Euripides, or Simonides, or Anacreon. At the tables are keen wits, quick at repartee, eager for debate, always ready to support some thesis, even though it be a whimsical paradox. Riddles, conundrums and catch questions were always popular. There were no after dinner speeches.

The Athenian maintained, theoretically, that the place for woman was inside the house; but in practice the matron enjoyed more liberty; she was not kept a prisoner. In her youth her training was directed toward domestic duties. She learned to spin, sew, weave and embroider, as well as cooking and the management of the household. As a child she had her toys, her dolls of painted clay or wax, with movable legs and arms. Her little brothers play with her till she is seven years old. She is not allowed to see men, even when she grows up. If she has no father, her nearest male kinsman, if a bachelor and not a full brother, has the first claim to marry her. Equality of pecuniary position is sought on both sides. The men felt that marriage was a burden, so distasteful that they did not enter into it till after they were 30, whereas the girls usually married very young. But marriage was felt to be a duty, to himself that he might have children to bury him and to pay due honors to his body in the tomb, and a duty to the state, that he might leave children to support it and to worship the gods. The first ceremony of marriage was the betrothal. The girl need not be present, for it was a contract pure and simple, with which she had nothing to do. As soon as a dowry was agreed upon, the girl was «given away» in the presence of witnesses. There was no church at all in our sense of the word. The only wedding ceremony was the «bringing home» of the bride, which might be regarded as the actual wedding. If the wife was divorced, the dowry had to be given back. When she died, it reverted to her nearest of kin. Weddings were usually celebrated in the winter and the time of the full moon was preferred. As a token of farewell to the old life, the girl dedicated her girdle, her toys or a lock of hair to Artemis or to a local nymph. Both the bride and the bridegroom on their wedding day bathed in water brought from some spring of special sanctity. The bride's dress was of some light color. The guests received a cake made of sesame seeds pounded and roasted and mixed with honey. The bride's father offered sacrifice, taking care to remove the gall of the victim, that no bitterness might enter the lives of the bride and groom. At the banquet the women were permitted to be present, but they sat at separate tables. The bride was given to the groom by her mother, and she was led to the chariot to be taken to her new home. Relatives and guests followed in procession, accompanied by flute and lyre players. The mother followed the chariot, holding up the nuptial torches. The door of the groom's house was specially decorated and on their arrival they were showered with confetti by the groom's mother. The bride ate a quince at the threshold, and then she was led to the bridal chamber, while her friends sang epithalamia, or wedding-hymns, outside the door.

JOSEPH E. HARRY.

GREEK THEATRE, The. The Greeks did not turn night into day as we do in the 20th century. Rising at early dawn the whole city thronged to the sacred precinct to witness the performance of not only one play but of three, and not only for one day but for three days in succession.

The theatre at Athens had a happy location. Shielded from the north wind by the Acropolis it was so situated that the afternoon breeze from the Saronic Gulf blew directly into the faces of the audience. The occasion was the great festival of Dionysus, and the time March, when everybody longed to be out of doors. The seating capacity of the theatre — though not the largest in Greece — was 17,000 or more. The "building" was as far removed from magnificence as Shakespeare's theatre from the Grand Opera House in Paris; there were no plush chairs, no boxes, but merely seats of wood (later of stone), without backs, except in the front row. The audience wore festal attire. A myrtle wreath sufficed to designate the capacity in which the spectator was present as a participant in the festival.

The Audience.— As the sun was hot and there was no awning, or canopy, the men wore broad-rimmed hats. The array of smart and fashionable dresses so conspicuous in a modern theatre was wholly absent. Thousands had to be contented with a threadbare tunic. All the resident Athenians were in attendance, even boys and slaves; strangers, too, were present, either as official guests or as interested spectators. The tickets were purchased at one of the offices in the city at six cents apiece. The state made a special appropriation for thousands of the poor: their tickets of admission were purchased with money from the public treasury. The 67 seats in the front row contained inscriptions indicating to what honored occupant they belonged: priests, the nine archons, the judges, foreign ambassadors and soldier's orphans. In the centre of this row was a marble chair with arms. This was the seat of the priest of Dionysus. The people were his guests. In the early period he would send boys with baskets containing food and wine to distribute among his guests. But later the audience grew too large, since the population increased rapidly, and visitors came more and more from the islands and from the mainland. Consequently, the people brought their lunches with them; a loaf of bread, a few onions and some garlic bulbs. Sometimes wine was furnished at the expense of the choregus. Though the audience was large and composed of various classes, it was extremely critical. They applauded by shouting and by clapping, if the performance was good: they did not hesitate to give loud expression to their feelings, or refrain from shedding tears, at the pathetic parts; but if the acting was bad, if an actor broke down, or mispronounced a word, they were quick to express their disapprobation by hissing, hooting, or even standing upon their seats. If an actor fell far below their expectation, a disturbance might arise: missiles were hurled, a fine imposed, or even corporal punishment inflicted.

The Actors.— Directly in front of the lowest seats, was a circular orchestra, over 60 feet in diameter, originally of beaten earth, but later paved with polygonal stones. In the centre of this was the *thymele,* or altar of the god, on the steps of which the flute-player took his seat. Back of the orchestra was a wall, about 10 feet high, with columns which could represent the façade of a palace or the front of a temple. At this point, in the earliest period, was erected a booth, which was originally used as a dressing room. This was called *skene* (tent), *scene.* Later the term was applied to the whole congeries of buildings, and later still to the stage itself; sometimes to the wall back of the stage. The actors and the chorus performed their respective parts on the common level of the orchestra, the narrow stage back of and above the orchestra being reserved for the appearance of the gods. There was probably no curtain. Aristotle thought it a mistake to try to produce tragical effects by elaborate machinery. The scenery in the time of Æschylus was probably as simple as that in a performance of a Shakespearian drama by the Ben Greet players. But in the Hellenistic age Greek enginery made transformations that would beggar the most gigantic efforts of modern times. From the time of Alexander the Great every important Greek town had its theatre. There was a great appeal to the imagination. But movable scenery was abundant: altars, monuments, cliffs, household utensils. The two entrances (on the sides) were called *parodoi.* Through these the chorus, the retinues (and sometimes the actors) made their appearance. The word for actor is *hypocrites.* In the classical age the number did not exceed three for any play, with the possible exception of the 'Œdipus Coloneus' of Sophocles; and they were always men, even for the feminine rôles. Hence a change of costume for the various parts was necessary. The traditional view is that the actors wore masks in the 5th century; but this has been assailed by some scholars. Later the wearing of masks is unquestionable. There were more than 27 famous actors before the time of Alexander. Some of them became celebrated as orators, statesmen or ambassadors. No disrepute attached to the profession, as at Rome. The actor's remuneration was an affair of the state. All financial arrangements were made by the archon, who assigned each rôle.

Musical Instruments.— The musical instrument was something like our clarionet, and was soft in tone, sustaining rather than interfering with the voice. The Athenians were exceedingly fastidious in matters of pronunciation. The voice had to be loud, but also clear and full of feeling and expression, and the articulation distinct. There were no prompters. The movements of the body were very expressive. The leader of the chorus (coryphaeus) recited the anapests of the *parodos* and *exodus*, and the anapæstic verse in general, declaimed the iambic trimeter of ordinary dialogue, and sang the *kommoi* (odes of wild lament). All the *stasima* (choral songs in the orchestra) were danced. In the strophe the chorus danced to the right, in the antistrophe to the left; but in the *epodos* they stood still. The groups of scenes between two stasima were called *episodes*. The dance consisted merely in graceful movements of the body, though each kind of drama had its peculiar style: in the satyric after-piece the dance was rapid, tumultuous, farcical.

Costumes.— The costumes of the actors were as characteristic of the Greek drama as the shape and arrangement of the theatre itself. In tragedy the dress was conventional, but in comedy that of ordinary life. The tunic was long, loose and full, with sleeves to the waist and richly embroidered with vertical and horizontal stripes. Around the tunic a high girdle richly ornamented was worn. The colors were usually bright, but also grey, green, blue and black. Under the tunic was some kind of padding to increase the size of the actor. The outer garment was called *himation*, which was of two varieties, rectangular and semicircular. They were splendidly embroidered in gold. Weapons were carried and garlands worn. The staff is frequently mentioned. Under the actor's shoes (cothurni) were high square painted soles, though this is now disputed in some quarters. The musicians wore long robes and garlands.

The Drama.— A Greek drama differed in many ways from a modern play. In the first place, it was oratorical, rather than conversational, statuesque rather than picturesque. To-day a play presents a scene in a drawing-room; the characters talk as in ordinary life and seem to be oblivious of the presence of the audience; and in their endeavor to become realistic they lower their voices to such an extent that they are frequently not heard by the audience. In Athens the actor spoke in a louder voice and out toward the audience. Facial expressions, which mean so much in a modern theatre, were out of the question (even if masks were not worn), for the actor was so far removed from the majority of the spectators; yet there was some compensation in the clearness with which the voice carried in an auditorium of such splendid acoustic properties, in the expressive movements of the body, and in the ideal beauty and heroic solemnity which were impressed on the characters and on the play as a whole. The color and cut of the hair was always significant; auburn hair meant beauty; curly hair, strength; black hair, sorrow; and red hair, rascality.

The Greeks were southerners, and southerners are more highly endowed with dramatic talent than northern nations. The Greek was nearer nature than we; he did not try to suppress his emotions; his bank of imagination was almost inexhaustible; he felt the same agony, the same ecstasy that children feel, and he had the same plenitude of belief. Tears would start unbidden to his eyes, as he listened to the portrayal of the grief of Demeter separated from her daughter, or of Antigone dragged away to be entombed in a living grave. So the theatre exercised a great influence in forming the lives and characters of the people. The literary quality of the Greek dramas was so high that it has never been excelled, and so they formed in the hearers a power of acute observation and of sane literary judgment, and coming at such long intervals, in an age when the attention was not distracted by the hasty reading of newspapers, they left an extraordinarily deep and lasting impression. See GREEK DRAMA.

JOSEPH E. HARRY.

GREELEY, Horace, American journalist: b. Amherst, N. H., 3 Feb. 1811; d. Pleasantville, N. Y., 29 Nov. 1872. More than 40 years after his death, Horace Greeley's name remains at the head of the roll of American journalists. Successors in the primacy of current discussion may surpass him, as doubtless some of them already have, in consistency and learning, but hardly in the chief essentials of a journalistic style; others may exert a more salutary influence, if not so personally diffused; but in the respect of high ideals, courage, intellectual force and personal magnetism, the qualities which impel a man of letters to be also a man of action, Horace Greeley was of heroic mold. He was no pop-gun journalist firing from a sky-sanctum, but a face-to-face champion in the arena of public affairs, laying about him with pen and speech like an ancient Bayard with his sword. The battles he fought for humanity, and the blows he gave and received, have made him for all time the epic figure of the American press.

Born in rural New Hampshire, of English and Scotch-Irish descent, he epitomized his heritage and his attainment in the dedication of his autobiography «To our American boys, who, born in poverty, cradled in obscurity and early called from school to rugged labor, are seeking to convert obstacle into opportunity, and wrest achievement from difficulty.» Though physically a weak child, his intellect was strong, and when near his tenth year his father removed to Vermont, the boy took with him the reputation of a mental prodigy; so, with little schooling and much reading, he was thought when 14 to be a fit apprentice to a printer, setting forth four years later as a journeyman. His parents had moved to western Pennsylvania, and he followed; but after a desultory practice of his art he came to the metropolis on 17 Aug. 1831, with $10 in his pocket, and so rustic in dress and manners as to fall under suspicion of being a runaway apprentice. Later in life, at least, his face and his figure would have lent distinction to the utmost elegance of style; but his dress was so careless even after the long period of comparative poverty was passed, that the peculiarity became one of his distinguishing features as a public character; and to the last there were friends of little discernment who thought this eccentricity was studied affectation: but manifestly his dress, like his unkempt handwriting was the unconscious expression of a spirit so concentrated on the intellectual interests of its life as to be oblivious to mere appearances.

After 18 months of dubious success in New York as a journeyman, in his 21st year, he joined a friend in setting up a modest printing-office, which on 22 March 1834, issued the *New Yorker*, a literary weekly in the general style of Willis' *Mirror*, under the firm name of H. Greeley & Company. For four years the young printer showed his editorial aptitude to such good effect that in 1838 he was asked to conduct the *Jeffersonian*, a Whig campaign paper. This was so effective that in 1840 he was encouraged to edit and publish the *Log-Cabin*, a weekly which gained a circulation of 80,000, brought him a reputation as a political writer, and active participation in politics with the Whig leaders, Governor Seward and Thurlow Weed. It contributed much to the election of General Harrison, but very little to the purse of the ambitious editor. On 10 April of the following year, 1841, he issued the first number of the New York *Tribune*, as a Whig daily of independent spirit. He was still editing the *New Yorker* and the *Log-Cabin*, both of which were soon discontinued, the *Weekly Tribune* in a way taking their place. Though the *New Yorker* had brought him literary reputation, it had not been profitable, because of uncollectible bills which at the end amounted to $10,000. Still, at the outset of the *Tribune* he was able to count $2,000 to his credit in cash and material. He was then 30 years of age, and for 30 years thereafter the paper grew steadily in circulation, influence and profit, until, a few weeks after his death, a sale of the majority interest indicated that the «good-will» of the *Tribune*, aside from its material and real estate, was held to be worth about a million dollars. The Greeley interest was then small, since he had parted with most of it to sustain his generous methods of giving and lending.

He had a great capacity for literary work, and when absent for travel or business was a copious contributor to his paper. To his rather delicate physical habit was perhaps due his distaste for all stimulants, alcoholic or otherwise, and his adherence through life to the vegetarian doctrines of Dr. Graham; another follower of the latter being his wife, Mary Young Cheney, also a writer, whom he married in 1836. His moderate advocacy of temperance in food and drink, coupled with his then unorthodox denial of eternal punishment, helped to identify him in the public minds with most of the «isms» of the time, including Fourierism and spiritualism; when in fact his mind and his paper were merely open to free inquiry, and were active in exposing vagaries of opinion wherever manifested. Protection to American industry, and abolitionism, were the only varieties which he accepted without qualification; and while the pro-slavery party detested him as a dangerous agitator, it is possible at this day even from their point of view to admire the moderation, the candor and the gentle humanity of his treatment of the slavery question. In all issues concerning the practical affairs of life, like marriage and divorce, he was guided by rare common-sense, and usually his arguments were scholarly and moderate; but in matters of personal controversy he was distinctly human, uniting with a taste for the intellectual fray a command of facts, and a force and pungency of presentation, which never seem admirable in an opponent.

He was in great demand as a lecturer and as a speaker at agricultural fairs, his addresses always being distinguished by a desire to be helpful to working humanity and by elevated motives. Though not a jester, genial humor and intellectual exchange were characteristic of his social intercourse. His books, with one or two exceptions, were collections of his addresses and newspaper articles. His first book, ‘Hints Toward Reforms,’ appeared in 1850, and was followed by ‘Glances at Europe’ (1851); ‘A History of the Struggle for Slavery Extension or Restriction’ (1856); ‘The Overland Journey to California’ (1859); ‘An Address on Success in Business’ (1867); ‘Recollections of a Busy Life,’ formed on a series of articles in the New York *Ledger* (1869); ‘Essays Designed to Elucidate the Science of Political Economy’ (1870); ‘Letters from Texas and the Lower Mississippi, and an Address to the Farmers of Texas’ (1871); ‘What I Know of Farming’ (1871); and ‘The American Conflict,’ written as a book, the first volume appearing in 1864 and the second in 1867. This work on the Civil War is remarkable, when considered in the light of his purpose to show «the inevitable sequence whereby ideas proved the germ of events»; but it was hastily prepared, and while strikingly accurate in a large sense, will not bear scrutiny in some of the minor details of war history.

Neither his political friends, nor his party, nor the causes he espoused, could hold him to a course of partisan loyalty contrary to his own convictions of right and duty. As a member of the Seward-Weed-Greeley «triumvirate,» he was often a thorn in the flesh of the senior members; his letter of 11 Nov. 1854, dissolving «the political firm,» being one of the frankest documents in the history of American politics. During the Civil War he occasionally embarressed Mr. Lincoln's administration by what seemed then to be untimely cries of «On to Richmond!» immediate emancipation, and peace. On the whole, his influence for the Union cause was powerful; but when, the war being over, he advocated general amnesty, and finally as an object lesson went on the bail bond of Jefferson Davis, he lost the support of a large body of his most ardent anti-slavery admirers. The clamor against him called forth a characteristic defiance in his letter to members of the Union League Club, who were seeking to discipline him. Having further alienated the Republican party by his general attitude in «reconstruction» matters, he became the logical candidate for the Presidency, in 1872, of the Democrats at Baltimore and the Liberal Republicans at Cincinnati, in opposition to a second term for General Grant. Though personally he made a brilliant canvass, the influences at work in his favor were inharmonious and disintegrating, and the result was a most humiliating defeat. This he appeared to bear with mental buoyancy, despite the affliction of his wife's death, which occurred a week before the election, he having left the stump in September to watch unremittingly at her bedside. On 6 November, the day after his defeat, he resumed the editorship of the *Tribune*, which six months before he had relinquished to Whitelaw Reid. Thereafter he contributed to only four issues of the paper, for the strain of his domestic and political misfortunes had aggravated his tendency to insomnia; on the 12th he fell seriously ill, and on the 29th he succumbed to inflammation of the brain. The last few months of his eventful career supplied most of the elements essential to a Greek tragedy. On 23 December, the *Tribune* having been reorganized, with Mr. Reid in permanent control, there first appeared at the head of the editorial page the line "Founded by Horace Greeley," as a memorial to the great journalist and reformer. A bronze statute was erected in the portal of the new *Tribune* office, and another statue in the angle made by Broadway and Sixth Avenue, appropriately named "Greeley Square," after the man who was second to no other citizen in establishing the intellectual ascendancy of the metropolis.

CLARENCE CLOUGH BUEL.

GREELEY, Colo., city, county-seat of Weld County; on the Cache la Poudre River, the Union P., the C. and S., and D. L. and N. W. railroads; about 50 miles north of Denver. The place was settled in 1870 by the "Greeley Colony" (named after Horace Greeley), made up mainly of New England people. By irrigation they have made of the almost barren region an excellent agricultural country. It is the seat of a State normal school. The chief manufactures are flour and beet-sugar. Its trade is in its manufactured articles, also sheep, cattle, grain and vegetables. Pop. 10,000.

GREELY, Adolphus Washington, American Arctic explorer: b. Newburyport, Mass., 27 March 1844. After receiving a high school education he enlisted as a private in the 19th Massachusetts Volunteer Infantry, serving in the Civil War from 1861 to 1865. He entered the regular army in 1867 as second lieutenant and was appointed to the signal service. In 1881 he was put in command of an Arctic expedition, organized to carry out the plan of establishing circumpolar stations in accordance with the recommendations of the International Geographical Congress held at Hamburg in 1879. The exploring party made their headquarters for two years at Discovery Harbor, Grinnell Land. In an expedition made by a detailed party, the highest point north attained up to that date, 83° 24', was reached. Grinnell Land was crossed to the western polar ocean, and other discoveries made. The relief expeditions of 1882 and 1883 failing to reach him he retreated by boat to Cape Sabine with great difficulty, and during the winter of 1883 lost, through cold and famine, all but seven of his party of 25. Meanwhile Com. Winfield S. Schley had been despatched on a relief expedition, and in June 1884 rescued them at Cape Sabine. From his services to geographical science Lieutenant Greely was awarded the Founder's Medal of the Royal Geographical Society, and the Roquette Medal by the Société de Géographie of Paris. He was promoted captain in the United States army, in 1887 became chief signal officer, with the rank of brigadier-general, the first enlisted man and volunteer to reach that grade in the regular army. Under his command the telegraphic systems, line, cable and wireless, of Porto Rico, Cuba, the Philippine Islands and Alaska were developed and extended. In 1906 he was promoted major-general, when he ended the Ute campaign without bloodshed, and the same year conducted the relief of 400,000 earthquake sufferers in San Francisco without the occurrence of a single death. He retired 27 March 1908. He is one of the three American members of the International Colonial Institute. He has many times represented the United States abroad, the last time as military ambassador at the coronation of George V. Consult Greely, 'Three Years of Arctic Service' (1886); report of the Lady Franklin Bay Expedition (1892) and many other publications; Schley, 'The Rescue of Greely' (1885).

GREEN, Alice Sophia Amelia (STOPFORD), English historian: b. Kells, Ireland, 1849. She was privately educated. In 1877 she was married to John Richard Green (q.v.) the historian. She edited his 'Conquest of England' (1883), prepared a revised edition (1888) and, with Miss K. Norgate, a finely illustrated edition (1892) of the 'Short History of the English People.' Her original works are 'Henry II' (1888); 'Town Life in the Fifteenth Century' (1894); 'The Making of Ireland and its Undoing' (1908); 'Irish Nationality' (1911); 'The Old Irish World' (1912); Woman's Place in the World of Letters' (1913).

GREEN, Andrew Haswell, American lawyer: b. Worcester, Mass., 6 Oct. 1820; d. 13 Nov. 1903. He studied law, practised his profession in New York, and was there president of the board of commissioners of education, and comptroller (1871–76). In the latter capacity he re-established the municipal credit, seriously impaired by the embezzlements of the Tweed ring. He originated in 1868 the plan for Greater New York, executed in 1897, and also devised the plan for the consolidation of the Astor, Lenox and Tilden foundations as the New York Public Library. He also assisted in establishing the American Museum of Natural History and the Metropolitan Museum of Art, and founded and became president of the New York Zoological Society. He was shot by Cornelius M. Williams, a negro, pronounced insane. It developed that he lost his life through resembance to another against whom the assassin had a supposed grievance.

GREEN, Anna Katharine (MRS. CHARLES ROHLFS), American author: b. Brooklyn, N. Y., 11 Nov. 1846. She graduated from Ripley Female College in 1867; but it was not until 1878 that she published her first novel, 'The Leavenworth Case,' which immediately became immensely popular. In 1884 she married Charles Rohlfs, an actor, who had been for some years with Booth and other tragedians. In 1889 he and his wife planned together furniture for their house. This developed into a style new and distinctive in furniture in both form and ornamental design, which became known as the "Rohlfs furniture." Mrs. Rohlfs continued turning out novels with wonderful rapidity; and all of them met with the favor of the special reading public to which she addressed herself. These are excellent detective stories in which the author shows a genius for plot and intricate situations. The characters are often untrue to life, but they are made to move along with such rapidity that these minor considerations are forgotten or not noticed by the uncritical public, which forms most of Mrs. Rohlfs' readers. Her long list of published works includes 'Agatha Webb'; 'Behind Closed Doors' (1888); 'A Circular Study'; 'Cynthia Wakeham's Money'; 'A Difficult Problem and other Stories'; 'The Doctor, his Wife and the Clock' (1895); 'Doctor Izard'; 'Forsaken Inn' (1890); 'The Hand and the Ring' (1883); 'Lost Man's Lane'; 'Marked Personal' (1893); 'A Matter of Millions'; 'The Mill Mystery'; 'Miss Hard, an Enigma'; 'The Old Stone House and Other Stories'; 'One of my Sons'; 'Seven to Twelve'; 'X. Y. and Z.'; 'A Strange Disappearance'; 'The Sword of Damocles'; 'That Affair Next Door' (1897); 'The Amethyst Box'; 'The House in the Mist' (1905); 'The Millionaire Baby' (1905); 'The Woman in the Alcove' (1906); 'The Chief Legatee' (1907); 'The Mayor's Wife' (1907); 'The Filigree Ball' (1908); 'Three Thousand Dollars' (1909); 'The House of the Whispering Pines' (1910); 'Initials Only' (1911); 'Masterpieces of Mystery' (1912): 'Dark Hollow' (1914); 'The Golden Slipper and other Problems for Violet Strange' (1915); 'The Mystery of the Hasty Arrow' (1917). Mrs. Rohlfs has also written a drama 'Risifi's Daughter'; a book of verse, 'The Defense of the Bridge, and Other Poems,' and has contributed to the moving picture stage. In this latter field one of her scenarios, a serial, 'Who is Number One?' was very prominently billed in 1917. 'The Leavenworth Case' and several of her other stories have been dramatized and others have been turned into scenarios.

GREEN, Ashbel, American Presbyterian clergyman: b. 6 July 1762; d. 19 May 1848. He was graduated from the College of New Jersey (now Princeton University) in 1783, and appointed tutor and subsequently professor of mathematics and natural philosophy in that institution, which latter position he held for a year and a half. In 1786 he was licensed to preach and took up ministerial work in Philadelphia. From 1792 to 1800 he was chaplain to Congress, and in 1809 took a prominent part in forming the Philadelphia Bible Society, the earliest institution of the kind in the United States. He drafted the constitution of the Princeton Theological Seminary, of which he was one of the originators, and in 1812 was elected president of Princeton College. In 1822 he resigned this office and returned to Philadelphia to edit the *Christian Advocate,* a religious monthly. For half a century he was one of the leading men in the Presbyterian Church. Among his many writings are 'Discourse Delivered in the College of New Jersey, with a History of the College' (1822); 'History of Presbyterian Missions'; 'Lectures on the Shorter Catechism.'

GREEN, Bartholomew, American publisher: b. Cambridge, Mass., 1666; d. 1732. He published the first newspaper that appeared in the American colonies, and succeeded to his father's business at Cambridge, extended it at Boston, where the office of the *Boston News Letter* was situated. The proprietor and editor was John Campbell, postmaster of Boston. He eventually bought in the paper, which became notable for outspokenness on topics of religion and politics.

GREEN, Beriah, American abolitionist: b. New York State, 1794; d. 1874. He was educated at Middlebury College, Vermont, became professor of sacred literature in Western Reserve College in 1821, but was compelled to resign in a few months through the opposition aroused by his anti-slavery views. He was for many years president of the Oneida Institute, Ohio. He was a great friend of William Lloyd Garrison, and exerted a wide influence in abolitionist circles. Among his writings are 'History of the Quakers' (1823).

GREEN, Duff, American politician and journalist: b. Woodford County, Ky., 1791; d. Dalton, Ga., 1875. He served with the Kentucky militia in the War of 1812; after the admission of Missouri as a State was appointed State Senator (1823), and became editor and proprietor of the Saint Louis *Enquirer.* In 1825 he removed to Washington, D. C., where he purchased the United States *Telegraph.* This became the administration organ, and Green rose to high favor with President Jackson. He was a member of the "Kitchen Cabinet." After the rupture between Calhoun and Jackson, the *Telegraph* as the organ of the nullificationists bitterly attacked Jackson. After some years spent in Europe he returned to the United States (1844) and edited a short-lived newspaper in New York. During the latter years of his life he was actively engaged in promoting the development of the South, and was one of the founders of the town of Dalton, Ga.

GREEN, Hetty Howland Robinson, American financier: b. New Bedford, Mass., 21 Nov. 1835; d. 3 July 1916. She was the richest woman in America and probably the boldest and ablest woman financier of her time. Although she had an interest in nearly every large corporation and important enterprise in the world, she managed personally her own property in stocks, bonds, and real estate in Chicago, New York and elsewhere.

GREEN, John Richard, English historian: b. Oxford, 12 Dec. 1837; d. Mentone, France, 7 March 1883. He was graduated in 1859 from Jesus College, Oxford, where, since the study of modern history had not yet taken any considerable place in the university, the officers failed of sympathy with his preference for Matthew Paris to the classics. In 1860 he was ordained a deacon and became curate of Saint Barnabas, London, in 1863 was appointed to Holy Trinity, Hoxton, and in 1866 to Saint Philip's, Stepney. Failing health and increasingly liberal views caused him to withdraw from clerical life, and from 1869 he was librarian at Lambeth. His first literary work of importance consisted of articles, especially brief essays on historical subjects, in the *Saturday Review.* In 1874, after having been twice rewritten, his 'Short History of the English People' appeared. This work unified English history as no other had yet done. "What Macaulay had done for a period of English history," says Creighton, "Green did for it as a whole." Green's purpose was to exhibit the development of popular life by a description of the leading manifestations of social progress. The book was skilful in arrangement and artistic in style, and met with an instant and large success. The author expanded it into his

'History of English People' (1877–80), not only to secure greater fullness but also to defend views merely stated in the smaller work. He then attempted a history for scholars, of which but two parts were published — 'The Making of England' (1882), which extends from Britain as left by the Romans to the consolidation under Egbert, and secured his fame as a critical historian, particularly through his method of employing archæology for the purposes of history; and 'The Conquest of England' (1883), which continued the narrative to the arrival of the Normans. Green's influence on historical studies in England was very great, and his 'Short History' and 'History' still hold a foremost rank. The Oxford Historical Society and the 'English Historical Review' were originally suggested by him; and he also published 'Stray Studies in England and Italy' (1876), a reprint of early papers; 'Readings from English History' (1879), a series of extracts; 'A Short Geography of the British Isles' (1880); and an edition of Addison's 'Essays' (1881). His 'Letters' were published in 1901. He is understood to have been the original of Mrs. Humphrey Ward's 'Robert Elsmere.' Consult Bryce, 'Studies in Contemporary Biography' (1903).

GREEN, Joseph Reynolds, English botanist: b. Stowmarket, Suffolk, 1860; d. 1914. He was educated at Trinity College, Cambridge, and became in 1887 professor of botany to the Pharmaceutical Society of Great Britain, a post which he held until 1907. In 1895 he was chosen Fellow of the Royal Society and in 1902 of Downing College, Cambridge. His researches in physiological botany are his most important work. His publications include 'Manual of Botany' (1895); 'The Soluble Ferments and Fermentation' (1899); 'Introduction to Vegetable Physiology' (1900); 'Primer of Botany' (1910); 'History of Botany from 1860–1900' (1910).

GREEN, Mary Anne Everett, English historian: b. Sheffield, 1818; d. 1895. Her work is distinguished by its conscientious industry. She wrote under her maiden name, Wood. She married George Pycock Green, an artist, in 1845; and worked in the Public Record office until 1885. Her publications include 'Lives of the Princesses of England' (6 vols., 1849–55); 'Letters of Royal Ladies' (1846); and numerous editions of the diaries and letters of persons of note; and 'Elizabeth, Electress Palatine and Queen of Bohemia' (1909).

GREEN, Norvin, American capitalist: b. New Albany, Ind., 1818; d. 1893. He was graduated from the University of Louisville in 1840 with the degree of M.D., and practised until 1853. He served in the Kentucky legislature in 1849, 1850 and 1868. In 1854 he entered the telegraph business and soon became prominent as president of the Southwestern Telegraph Company. In this capacity he coordinated the work of six leading telegraph companies, which eventually led to the formation of the Western Union Telegraph Company in 1866. Green became one of its vice-presidents, and was chosen president in 1878. He was also head of the Louisville, Cincinnati and Lexington Railroad (1870–73) and president of the American Institute of Electrical Engineers (1884–86).

GREEN, Samuel Swett, American librarian: b. Worcester, Mass., 1837. He was graduated at Harvard in 1858 and received a degree also from the Divinity School in 1864. He was librarian of the Worcester Free Library from 1871–1909, when he retired. He served as trustee of that institution from 1867–71. In 1890 he was appointed a member of the Free Public Library Commission of Massachusetts. He was one of the founders of the American Library Association; its first vice-president and president in 1891. In 1893 he presided over the World's Congress of Librarians. He is also a member of various educational and library organizations. His publications include 'Libraries and Schools' (1883); 'Library Aids' (1883); 'The Public Library Movement in the United States, 1853–93' (1913), and numerous papers and articles on subjects in library economy and history.

GREEN, Seth, American pisciculturist: b. Irondequoit, N. Y., 19 March 1817; d. Rochester, N. Y., 20 Aug. 1888. He learned the natural history necessary for his profession from observation and private reading, and began his life's work by the artificial hatching of trout roe. He was looked upon as the leading expert in this department of fish culture, but his first great triumph in new fields came with his success in the reproduction of shad. The Seth Green shad-hatching box was invented in 1867, and, although it has been superseded, by this device shad culture was first demonstrated to be possible and its inventor must be looked upon as the pioneer in this difficult department of pisciculture. The Connecticut River was restocked by means of this invention. In 1868 he was made fish commissioner for the State of New York, and the following year undertook the artificial reproduction of whitefish. He was successful in his experiments, and was acknowledged as one of the fathers of fish culture in the United States. From 1870 until his death he was superintendent of the State hatchery at Caledonia, N. Y.

GREEN, Thomas Hill, English philosopher: b. Birkin, Yorkshire, 7 April 1836; d. Oxford, 15 March 1882. He was educated at Rugby and Oxford; was elected Fellow at Balliol in 1862, the first lay tutor on that foundation (1867), and in 1878 Whyte professor of moral philosophy in the university. His principal work as a philosopher was the foundation of the so-called Neo-Hegelian School. He is supposed to have been taken by Mrs. Ward as a model for her Mr. Gray in 'Robert Elsmere'; but the resemblance is by no means complete, as Mr. Gray's work is undoubtedly, as he appears in 'Robert Elsmere,' rather that of a destructive literary critic than a constructive philosopher. His works include 'Introduction to Hume's Treatise of Human Nature' (1874), and 'Prolegomena to Ethics' (1883).

GREEN, Valentine, English engraver: b. Salford, Oxfordshire, 1739; d. London, 1813. He received instruction from Robert Hancock at Worcester. In 1765 he took up his residence in London, and soon became well known for his excellent mezzotints. As engraver to the king, he was permitted to copy the pictures at the gallery of Düsseldorf and had succeeded in making some two dozen plates, when the siege of that city by the French was undertaken, He left about 400 plates, after Reynolds, Romney, Gainsborough and others. His antiquarian and historical studies gained him fellowships in the Society of Antiquaries and the Royal Society. He was assisted in much of his work by his son, Rupert. Consult his ‹Life› by Whitman (London 1902).

GREEN, William Henry, American Presbyterian theologian: b. Groveville, N. J., 1825; d. 1900. He studied at Lafayette College and at Princeton Theological Seminary. For a few years he remained at the seminary in the capacity of instructor in Hebrew; and from 1849–51 served as pastor of the Central Presbyterian Church of Philadelphia. He resigned this post in order to fill the chair of biblical and Oriental literature at Princeton Seminary. He refused to accept the presidency of that institution, although he was officially recognized as its head. He was also the chairman of the Old Testament Revision Company. His publications include ‹A Grammar of the Hebrew Language› (1861); ‹The Pentateuch Vindicated from the Aspersions of Bishop Colenso› (1863); ‹A Hebrew Chrestomathy› (1865); ‹The Argument of the Book of Job Unfolded› (1874); ‹Moses and the Prophets› (1883); ‹Hebrew Feasts› (1885); ‹The Higher Criticism of the Pentateuch› (1895); ‹The Unity of the Book of Genesis› (1895); ‹A General Introduction to the Old Testament› (2 vols., 1898–99).

GREEN, a color found in the spectrum between the blue and the yellow. See COLOR; COLOR IN PLANTS; COLORING MATTERS; COAL-TAR COLORS.

GREEN BAY, Wis., city and county-seat of Brown County, situated at the head or southern point of the bay of the same name, and at the mouth of the Fox River, on the Chicago and Northwestern, Chicago, Milwaukee and Saint Paul, the Green Bay and Western railroads. Green Bay has an extensive commerce. Fifty-seven passenger trains arrive daily over the four railroads entering the city. An extensive lake traffic is also carried on, the harbor, through government appropriations, having been made accessible to the largest vessels upon the Great Lakes. Coal constitutes the largest single import, Green Bay being an advantageous distributing point. The largest export by way of the lakes is grain, although much lumber has hitherto been shipped out. The city is provided with a complete electric railway system, including an interurban line up the Fox River valley to Kaukauna, where a junction is made with another electric line passing through Appleton, Neenah, Oshkosh and Fond du Lac. A light and power plant furnishes gas for lighting and heating and electricity for light and power, many electric motors now being in use. There are a number of manufacturing plants — 3 large breweries, 3 paper mills and 1 sulphite mill, 2 large saw mills, 3 planing mills, 2 very large canning factories, 1 glove factory, 3 pure milk factories, 5 machine shops, 2 candy factories 1 pickle factory, 1 coffin factory, 1 carriage factory, 1 cornice factory, largest hard coal docks on the lakes, 1 grass rug factory, 1 multiplier machine factory, 2 flour mills, 2 knitting and mackinac factories. Several jobbing and wholesale concerns do a large business, the most important being grocery, hardware, crockery, and saddlery and harness. An extensive fishshipping business is also carried on. Water is supplied from artesian wells by a private company. Green Bay has a number of fine public buildings, the Kellogg library and three branch libraries, the Federal buildings, Saint Joseph's Academy, three hospitals and just outside the city limits the State Reformatory. The public school system has two high schools and 13 ward schools, employing 106 teachers, one continuation school, two open-air schools and one school for the deaf. There are also several parish schools, graded in the same manner as the public schools. There are many fine church buildings, and all the leading religious denominations are represented in the city. Green Bay, the oldest town in Wisconsin, was first visited in 1634 by Jean Nicollet, who had been sent by Champlain, governor of New France, to find the rumored short route to China. The site was a favorable one for an Indian village as well as a landing place for explorers and missionaries. It is known that Marquette, Joliet, Allouez and Tonti spent considerable time here. The town was therefore settled by the French, who impressed their character upon it for over 200 years, although it fell into the hands of the English at the close of the French and Indian War in 1763. In 1816 the Americans established a fort on the opposite side of the river, known as Fort Howard, around which a prosperous town of the same name grew up. In 1895 Fort Howard was annexed to Green Bay. The administration of the city is by commission form of government, mayor and two councilmen, elected for six-year terms. Assessed valuation: Lots, exclusive of buildings, $16,740,275; farm lands, $890,605; personal property, $4,803,570; bank stock, $1,191,900; total, $23,626,350. Pop. 25,236.

GREEN BAY, an arm of Lake Michigan, on the southwestern coast of the upper peninsula of Michigan and the eastern coast of Wisconsin. It is 120 miles long, from 10 to 20 miles wide, has an average depth of about 100 feet. Fox River, the outlet of Lake Winnebago, enters the bay at its head, at the city of Green Bay. The bay is navigable for the largest lake steamers. The largest cities on the bay are Green Bay and Marinette, in Wisconsin, and Menominee and Escanaba in Michigan. At its mouth lie several islands including Martin's Island, Washington Island and Summer Island.

GREEN COVE SPRINGS, Fla., town, county-seat of Clay County; on the Saint John's River, the Atlantic Coast Line Railroad. It contains a warm sulphur spring noted for its medicinal properties, and has a public library and courthouse. The trade is chiefly in fruits, vegetables and lumber. The water works and electric-light plant are the property of the city. The town is governed on the Commission system. Pop. 2,287.

GREEN CROSS NURSES, an auxiliary of the Home Defense League, organized in April 1917 by Mrs. Arthur J. Hanford of New York, with the objects of knitting and making garments to be turned over to the Red Cross, and of watching over the families of men drafted from the league. The members of the organization attend lectures to learn the elements of practical hygiene and emergency nursing. "They do not expect to take the place of trained nurses, but have been taught to look after a patient until medical help arrives." The nurses adopted a white uniform with a green cross on the sleeve, and a white flag with a green cross as their emblem.

GREEN EBONY, the name of the wood of *Jacaranda ovalifolia,* a South American tree of the genus *Bignonia.* The wood is very hard and of an olive green color, and produces an olive green, greenish yellow or brown color in dyeing. The flowers are elaborate and panicled. The species *Biya ebenus* is exported in large quantites from West India.

GREEN GLASS. See GLASS, VARIETIES OF.

GREEN ISLAND, N. Y., village of Albany County, on an island in the Hudson River opposite Troy, on the Delaware and Hudson and the New York Central and Hudson River railroads. It is connected with Watervliet and Troy by bridges; and has iron manufactories, machine shops and railroad car shops. Pop. 4,737.

GREEN MANURING, the agricultural practice of plowing under crops while succulent in order that they may enrich the surface layer by their decay. It is of ancient origin and wide popularity, especially in mild climates; less in tropical than it should be. The objects gained are the opening of the soil and especially the sub-soil by the roots of deep feeding plants; the raising of plant food from the lower strata to the surface layer and the saving of available plant food in the surface layer, material that would leach away beyond the reach of shallow-rooted plants; the addition of humus to the soil by the decay of the plants; and, with certain crops, the addition of nitrogenous foods obtained from the air. As the plants decay they also act upon insoluble plant food in the soil and make it available. Strictly speaking, the last three functions are those of a green manure proper, while the others pertain to what are known as cover crops. The same crops, however, are often used for both purposes. Green manures and cover crops belong to two classes: (1) shallow-rooted plants such as rye, buckwheat, mustard, rape, etc., which are especially useful on hard and poor soils open the way for more exacting crops; (2) deep-rooted plants such as clover, cow-pea, velvet bean, vetch and other leguminous plants which are still further useful because of their power of obtaining nitrogen from the air. See CLOVER; FERTILIZERS; LEGUMINOSÆ; ROOT; SOIL and articles on the crops mentioned.

GREEN MONKEYS, three similar species of small African moneys, often seen in menageries, and representing the genus *Cercopithecus,* may properly be called green moneys because of the prevailing tint of their fur. The one most commonly seen is *C. sabaeus,* the size of a cat, and remarkable for its unbroken silence. The vervet (*C. lalandi*) is small, grayish green, reddish white on the cheeks, throat and underparts, while the face, paws and end of the tail are jet black. It is common all over South Africa, where no other species of its large genus are found. The grivet (*C. griseoviridis*) is speckled olive-green, with a whitish forehead, chin and rump; it dwells in Abyssinia and is not numerous. All these monkeys, at least when young, are exceedingly docile and good-natured in captivity.

GREEN MOUNTAIN BOYS, the regiments of Vermont settlers raised to defend the New Hampshire grantees against the efforts of New York to oust them or collect quit-rents, and later for service in the Revolution. See ALLEN, ETHAN.

GREEN MOUNTAIN STATE, a popular name for the State of Vermont, from its being crossed by the Green Mountains. See GREEN MOUNTAINS; VERMONT.

GREEN MOUNTAINS, a range belonging to the Appalachian system properly extending from near Long Island Sound through the western part of Connecticut and Massachusetts, into Vermont and Canada. In the State of Vermont the range is known as Green Mountains; but south, in Massachusetts and Connecticut, it is called by the names Berkshire Hills, Taconic Mountains and Hoosac Mountains. The peaks of this range, one of the oldest in North America, have been worn down by erosion and weathering until in many places they have become low, round hills. Their greatest elevation is in Vermont; Mounts Killington, Mansfield, Camels Hump, Lincoln and Jay being the highest. Summit, a hamlet in the town of Mount Holly, in Rutland County, is the highest point crossed by a railroad. Some of the best building stone in the country is obtained from the Green Mountains. Granite and marble exist in large quantities. Slate abounds, and copper and manganese are found in several places. The range forms the divide between the basin of the Connecticut on the east and the Lake Champlain and Hudson River basins on the west. The rivers arising in the Green Mountains are short streams, but their waterpower is abundant. In the fertile valleys are rich farms, and sheep and cattle are raised on the uplands. The hemlock, spruce, pine and other evergreens which form striking parts of the forests, have given the name to this range. Hard wood trees and sugar maple are found on both the east and west slopes of the mountains. The beauty of the scenery and the climate make the Green Mountains a place much frequented in summer by tourists.

GREEN RIVER, Ky., has its rise in Lincoln County, flows south and west to Adair County; west, a very irregular course, to Butler County; then northwest to the Ohio River which it enters a few miles above Evansville, Ind. It is about 350 miles long, and is navigable for small steamers for a distance of about 200 miles from the Ohio; but for a part of this distance artificial means have been used to make it navigable. In Edmonson County this river passes within 80 feet of the mouth of Mammoth Cave. The subterranean stream called Echo River, which is seen in connection with the Mammoth Cave, flows into Green River.

GREEN RIVER, in Utah, has its rise in the western part of Wyoming, flows south and east into Colorado, south and west into Utah, then in a southern direction to the southeastern part of the State where it unites with the Grand to form the Colorado River. Major Powell (q.v.) and other explorers have passed through several of the remarkable cañons of this river. Its length is about 700 miles.

GREEN SNAKE, in the United States, a very slender, agile, harmless, grass-green, yellow-bellied serpent (*Liopeltis vernalis*), which is not only common in grassy places but in bushes, its color concealing it well in both places. It feeds mainly on insects. Several poisonous serpents of the far East, are called «green snakes» by English-speaking residents on account of their color.

GREEN SPRINGS, Va., Battle of, 6 July 1781. Lafayette, reinforced by Steuben, was pressing close on Cornwallis' rear down York peninsula; and the advance-guard under Wayne came unexpectedly upon an entire division of the British at Green Springs, on the James River. Immediate retreat meaning destruction, he charged them so fiercely that Cornwallis, thinking the entire American army was upon him, merely repelled the assaulting party and drew off his men, while Wayne retreated in the other direction. The American loss was 145.

GREEN VITRIOL. See COPPERAS.

GREENAWAY, Kate, English artist: b. London, 1846; d. there, 8 Nov. 1901. She studied at Heatherley's, South Kensington, and the Slade School, and first exhibited in 1868 at the Dudley Gallery. For many years her work regularly appeared in the exhibitions of the Water Color Society and the Academy. Her illustrations were widely published and popular in the United States as well as in Great Britain. She became especially famous for her pictures of child life, characterized by individuality of design, skilful coloring and humorous touches. Her books include 'A Painting Book for Boys and Girls' and 'Kate Greenaway Birthday Book.'

GREENBACK-LABOR PARTY, or NATIONAL PARTY. The workingmen during the «panic years» (1874–78) increasingly resorted to political activity to right their grievances, and in Ohio in 1877 began to call their local organization the «National Party.» In Massachusetts and Pennsylvania they fused with the Greenback Party (q.v.). On 22 Feb. 1878, at Toledo, Ohio, they held a convention which organized the fusion as the «National Party»; but the popular name for it was the old fusion name «Greenback-Labor.» Their platform was the Greenback one, with planks against prison contract labor and in favor of legislation for shorter hours. The new organization awakened hopes in the hopeless minorities in several States where the majority, Republican or Democratic, could not be overturned; and they organized fusions with it, which raised it at once to a popular vote (apparently) of over 1,000,000, and elected 14 Congressmen. In the close States each old party kept its own vote, with a slight falling off to the new one. The party proper elected but two representatives, five of the 14 being really Republicans and seven Democrats. In 1880 (9–10 June) it held a national convention at Chicago, and nominated James B. Weaver of Iowa, and B. J. Chambers of Texas, for President and Vice-President; Chambers declined, but no substitute was nominated. The platform had all the old planks in substance, and new ones against Chinese immigration, land-grants to railroads, and favors to corporations and bondholders, and in favor of sanitary regulations for manufactories. The fusions had largely disappeared, and the popular vote sunk to 306,867, and the Congressmen to eight; four from Missouri, two from Maine, one from New York and one from Texas. It retained its organization till 1884, when it fused with the Anti-Monopoly Party (q.v.) and nominated Benjamin F. Butler for the Presidency, polling in all 175,380 votes. It then practically disappeared. Consult Usher, 'The Greenback Movement' (1911).

GREENBACK PARTY, a political party in the United States that favored an increase in the greenback or paper currency, to be exchangeable for interest paying bonds. Though commonly bearing this name, its own choice (1874–76) was Independent Party. The prosperity of western agriculture during the War, due largely to the heavy government purchases and the payability of mortgages in depreciated paper, was attributed by a large section there to the plentifulness of the paper by itself; hence, when hard times had succeeded, it was believed that a fresh inflation of greenbacks would reproduce the same conditions. The chief obstacle to this was thought to be the eastern banking interests, which, having bought government bonds in greenbacks, had obtained the act of 1869 making them payable in coin whether so specified or not; and should have been forced to take what they gave, the more since paper was now at par and their bonds were not taxed. By 1868 the Ohio Democrats, led by George H. Pendleton, were insisting on the payment in greenbacks of all bonds not specifically payable in coin, as the 5–20's; this was called the «Ohio Idea.» Western Democratic conventions placed this plank in their platforms for three or four years, but the nomination of Greeley put an end to that in 1872. The revival of greenbackism is often attributed to the silver demonetization act of 1873; but in fact silver was above par at that time, the act drew no general attention, and but for the later fall in silver probably never would have done so. The real cause was the bringing forward of the Resumption Act, passed 14 Jan. 1875, to take effect 1879. On 25 Nov. 1874 a Greenback convention was held to protest against it, and adopted three resolutions — (1) that all bank and corporation currency should be withdrawn; (2) that no currency be allowed except government paper «based on the faith and resources of the nation,» and exchangeable on demand for 3.65 per cent bonds; (3) that coin should be paid only for interest on the national debt, and for that part of the principal which promised it. Several Democratic conventions indorsed these; but in 1876 the prospect of the hard-money Tilden being the next Presidential candidate, led the party to form an organization of its own. At a convention at Indianapolis, 17 May, they nominated Peter Cooper of New York and Newton Booth of California for President and Vice-President; Booth declined, and Samuel F. Cary of Ohio was substituted. The platform, besides the three points above, demanded the repeal of the Resumption Act. The ticket polled 81,737 votes, over half of them in Michigan, Illinois, Indiana, Iowa and Kansas. In the State elections the next year the party polled 187,095 votes, but the main strength continued to be in the West. The next year it was absorbed in the Greenback-Labor Party (q.v.).

GREENBACKS (as printed on the back in green ink), the current name, from the first of the legal-tender notes first issued by the government during the Civil War. (See DEBT, NATIONAL). The authorizing act was signed by Lincoln 25 Feb. 1862; it was the first ever passed by Congress making anything but coin legal tender, and nearly all the Democrats and many Republicans declared it unconstitutional. But war necessities were too exigent, and the bill authorized $150,000,000 of the notes, not receivable for import dues nor payable by the government as interest on its obligations. On 11 June 1862 and 3 March 1863 further issues were authorized; and on 3 Jan. 1864 they reached their maximum amount of $449,338,902. The great inflation, the uncertain fortunes of the War, and the belief that even if victorious the United States neither could nor would pay its enormous debt at face value, but would repudiate or scale it, combined to depreciate the value of the notes; throughout 1864 they were worth on an average only about 45 cents on the dollar, and on one day, 11 July, when Early was threatening Washington, they dropped in panic to about 35 cents — or as currently expressed, the "premium on gold" was 285. The legal tender acts had always been understood to be temporary war measures only, and a choice of evils; the secretary of the treasury (McCulloch) in his report for 1865, expressed the opinion that they ought not to be in force a day longer than was necessary to prepare for a return to the gold standard. The House passed a resolution of cordial concurrence, 144 to 6; and on 12 March 1866 both houses agreed on a reducing act, by which on 31 Dec. 1867 the volume of greenbacks stood at $356,000,000. But the demoralization of economic sentiment and judgment wrought by them, which afterward issued in the Greenback party, was already at work; many attributed the prosperity of the time to the currency inflation and even in Congress a majority had determined to make the paper currency a permanent feature of our finance. On 4 Feb. 1868 any further reduction was prohibited and the volume stood at this mark till October 1872, when it began to increase, amounting on 15 Jan. 1874 to $372,979,815. On 20 June 1874 the maximum was fixed at $382,000,000. Meantime a test case had been made up to try the question of their constitutionality (Hepburn *v.* Griswold) and in 1869 the Supreme Court, by five to three, headed by Chief-Justice Chase, decided against them. The fiercest political opposition was roused by this, however, and it became a party question. The Supreme Court, in May 1871, reversed its decision by one majority. This experience has led the Supreme Court to be excessively cautious about taking jurisdiction in any case where strong political feeling is involved. The question of legal tender has become unimportant in recent years. See GOLD STANDARD BILL.

GREENBRIER, any of various prickly vines of the genus *Smilax* (q.v.), commonly the catbrier (*S. rotundifolia*), which grows all over the eastern half of the United States and is especially abundant in the Southern Alleghanies, where it designates various mountain-ranges, streams, etc.

GREENBRIER MOUNTAINS, a range of mountains in the eastern part of West Virginia, lying west of the main part of the Alleghanies and parallel to the Greenbrier River (q.v.). Their average height is about 2,000 feet, the highest point being about 3,500 feet.

GREENBRIER RIVER, a river of West Virginia, rising in the Rich Mountains, Randolph County, flowing southwest into New River; length 150 miles.

GREENBRIER WHITE SULPHUR SPRINGS, W. Va., the name sometimes given the White Sulphur Springs in the Greenbrier Mountains to distinguished them from less important springs of similar character. See WHITE SULPHUR SPRINGS, W. Va.

GREENCASTLE, Ind., city and county-seat of Putnam County, on the Cleveland, Cincinnati, Chicago and Saint Louis, the Louisville, and Vandalia line railroads; the Terre Haute traction line with trains both east and west every hour, for passengers and express and four fast freight trains each day to Indianapolis and Terre-Haute. Greencastle is the seat of De Pauw University. The city has lumber-mills, cabinet works, making kitchen cabinets and like furniture, factories of lightning rods, pumps and tin-plate, a well-equipped apple packing plant, two large stone crushing plants. Greencastle has an excellent public school system, many churches and fine library building containing 7,000 volumes. The city is governed by a mayor and a municipal council elected every four years. A privately owned water plant furnishes an ample supply of excellent water, gas is supplied by an artificial gas plant and an electric plant furnishes light and industrial power. Greencastle was settled in 1822 and incorporated in 1849. Pop. 3,790.

GREENE, Aella, American journalist and poet; b. Chester, Mass., 1838; d. Springfield, Mass., 1903. He was author of 'Rhymes of Yankee-Land'; 'Into the Sunshine' (1881); 'Stanza and Sequel' (1884); 'Gathered from Life.'

GREENE, Albert Gorton, American lawyer and poet: b. Providence, R. I., 10 Feb. 1802; d. Cleveland, Ohio, 4 Jan. 1868. Graduated from Brown University 1820, he was admitted to the bar in 1823; in 1832 became clerk of the town and of the municipal court of Providence, and in 1858 judge of the court. From 1867 he was in Cleveland, Ohio. He was at one time president of the Rhode Island Historical Society, was a founder of the Providence Athenæum, began the Harris collection of American verse (now at Brown University), and wrote some well-known poems, such as 'Old Grimes' and 'The Baron's Last Banquet.'

GREENE, Charles Wilson, American professor of physiology and pharmacology: b. Crawford County, Indiana, 12 Aug. 1866. He studied at De Pauw, Leland Stanford and Johns Hopkins universities, receiving his Ph.D. from the last-named institution in 1898. He instructed in geography at De Pauw Normal School (1889–90); in physiology at Leland Stanford (1898–1900); and has been professor physiology and pharmacology at the University of Missouri since 1900. He conducted important investigations for the United States Bureau of Fisheries (1910–11). He is the author of 'Experimental Pharmacology' (3d ed. 1909); 'Textbook of Pharmacology' (1914).

As editor, he has published 'Kirke's Handbook of Physiology' (8th American ed., 1914).

GREENE, Christopher, American soldier: b. Warwick, R. I., 1737; d. Westchester County, N. Y., 13 May 1781. He was among the first to take the field on the American side after the engagements at Lexington and Concord. Subsequently, as colonel of a Rhode Island regiment, he participated in the campaign in Canada under Arnold. In 1777, while in command at Fort Mercer at Red Bank, on the Delaware, he sustained an attack from a large force of Hessians under Colonel Donop, who were repulsed with great slaughter. For these services a sword was voted him by Congress, and a monument commemorative of the battle and of the valor of the American commander was erected in the neighborhood of Fort Mercer in 1829.

GREENE, Daniel Crosby, American Congregational missionary: b. Roxbury, Mass., 1843; d. 1913. He was educated at Dartmouth College; and after serving as a private in the Civil War, went to Japan in 1869 as a missionary. After living at Kobe (1870–74); Yokohama (1874–80), and acting as professor of Old Testament exegesis at Kioto (1881–87), he became a member of the Yokohama New Testament translation committee. On returning to the United States, he delivered a course of lectures at Harvard University. He was editor of 'The Christian Movement in Japan' (3d. ed., 1907): Ritter's 'History of the Protestant Missions in Japan' (1898); and wrote 'Chinese New Testament Prepared for Japanese Readers' (1878), and 'Course of Study for Students of Japanese Language' (1903).

GREENE, Edward Lee, American botanist: b. Hopkinton, R. I., 20 Aug. 1843; d. Washington, D. C., 10 Nov. 1915. After studying at Albion College, Wisconsin, he took orders in the Protestant Episcopal Church (1871); but in 1885 entered the Church of Rome. He was professor of botany at the Roman Catholic University in Washington from 1895 to 1904. In the latter year he became associate in botany at the Smithsonian Institution. In 1893 he was president of the International Congress of Botanists, assembled in connection with the World's Columbian Exposition at Chicago. He published 'Illustrations of West American Oaks' (1890); 'Flora Franciscana' (1891); 'Pittonia' (1890); 'Leaflets of Botanical Observation' (1903); an autobiography, 'Roads to Rome in America' (1909); besides numerous contributions to taxonomy in various serial publications.

GREENE, Edwin, English song composer: b. 1857; d. Cheltenham, Eng., 10 Aug. 1915. He was author of 'Sing Me to Sleep,' which has been translated into every European and many other foreign languages and reached a sale of over 2,000,000 copies. He composed numerous other songs, was an entirely self-taught musician, and had been an invalid for the last 20 years of his life.

GREENE, Francis Vinton, American soldier: b. Providence, R. I., 27 June 1850. He was graduated at West Point with the rank of second lieutenant of artillery. In 1876 he was made military attaché at Saint Petersburg and remained at the headquarters of the Russian army during the Russo-Turkish War (1877–78), in the course of which he was twice decorated for bravery. Obtaining his captaincy in 1883 he was three years later appointed instructor in military engineering at West Point, but left the service to join the Barber Asphalt Company, and was president of the National Asphalt Company when the trust went into the hands of receivers. He entered the National Guard in 1889 on the staff of Gen. Louis Fitzgerald and was elected colonel of the Seventy-first regiment in 1892. In the Spanish-American War he was commissioned major-general of volunteers and served principally in the Philippines. In 1902 he was appointed police commissioner of New York. He has written 'The Russian Army and its Campaign in Turkey' (1879); 'Army Life in Russia' (1880); 'The Mississippi' (1882); 'Life of General Nathanael Greene' (1893); 'The Revolutionary War and the Military Policy of the United States' (1911).

GREENE, George Sears, American civil engineer and soldier: b. Warwick, R. I., 6 May 1801; d. Morristown, N. J., 28 Jan. 1899. He was graduated at West Point in 1823 and was for several years one of the professors there, but in 1836 adopted civil engineering as a profession, after sending in his resignation as an officer in the United States army. He was engaged subsequently in railway construction in many eastern States, and in 1856 the Croton Aqueduct Department of New York city commissioned him to execute several important works. He designed and constructed the reservoir in Central Park, widened High Bridge, and built a water tower and reservior at its western extremity. At the beginning of the Civil War he took command of the Sixtieth New York Volunteers, and was put in command of a brigade at Cedar Mountain and a division at Antietam. He took part in many other important events of the war and was severely wounded in an engagement near Chattanooga, in 1863. In 1866 he retired from the army and the following year was appointed commissioner and chief engineer of the Croton Aqueduct Department, and in 1871 was called to Washington, D. C., as chief engineer of public works. During his three years' incumbency of that office he planned the sewer system of the national capital.

GREENE, George Washington, American historian: b. East Greenwich, R. I., 8 April 1811; d. there, 2 Feb. 1883. He was a grandson of Gen. Nathanael Greene (q.v.) of Revolutionary fame. After study in Brown University, he traveled extensively in Europe, was United States consul at Rome in 1839–45, and from 1848 until his resignation in 1852 was professor of modern languages at Brown University. He was appointed non-resident professor of history at Cornell in 1872. His publications include several historical works, such as 'Historical View of the American Revolution' (1865); 'Life of Nathanael Greene' (1867–71), 'The German Element in the War of American Independence' (1876), and a 'Short History of Rhode Island' (1877).

GREENE, Homer, American author and lawyer: b. Ariel, Pa., 10 Jan. 1853. He was graduated from Union College in 1876, from the Albany Law School in 1878, was admitted to the bar in 1879, and has since been in practice at Honesdale, Pa. In Pennsylvania politics he has been active as a Republican. He has contributed much verse and prose to the magazines and published 'The Blind Brother' (1887); 'Burnham Breaker' (1887); 'Coal and the Coal Mines' (1889); 'The Riverpark Rebellion' (1892); 'A Tale of a Tow-path'; 'Pickett's Gap' (1902); 'A Lincoln Conscript' (1909); 'Handicapped, the Story of a White-haired Boy' (1915). He is the author of the much-quoted poem 'What My Lover Said,' and other popular verse.

GREENE, Nathanael, American soldier: b. Patawomut, Warwick County, R. I., 7 Aug. 1742; d. Mulberry Grove, Ga., 19 June 1786. His father, a leading preacher among the Quakers, was the owner of an anchor forge and a grist mill. He was brought up as a Quaker, and trained from childhood to work on the farm and at the forge. Resolute perseverance in the midst of many obstacles gave him in the course of time a more than ordinary familiarity with ancient and English history, geometry, law and moral and political science. In 1770 he was chosen a member of the general assembly for Coventry, whither he had removed to take charge of another forge; and from that time continued to take an active part in public affairs. He was one of the first to engage in the military exercises which prepared the way for resistance to the encroachments of the mother country, and this open renunciation of the principles of his sect was promptly followed by formal excommunication. In 1774 he joined the Kentish guards as a private; in July of the same year was married to Catharine Littlefield of Block Island, and in 1775 was appointed by the general assembly to command as brigadier-general the Rhode Island contingent to the army before Boston. He joined his command at Roxbury on 3 June and from that time remained in active service without a day's furlough till the final disbandment of the army in 1783. At Boston his brigade was distinguished by its discipline, and after the evacuation he was entrusted with the defense of Long Island. He distinguished himself in the battle of Harlem Heights, later commanded a portion of Washington's army near Fort Washington on the Hudson, and in September he was made major-general and appointed to the command in New Jersey. At Trenton he led the division with which Washington marched in person, and, with Knox, was for following up the advantages of that brilliant surprise by advancing directly upon the other detachments of the enemy. He took an equal part in the battle of Princeton, and was entrusted by Washington during the winter with a confidential communication to Congress. At the Brandywine he commanded a division, and by a rapid march and successful stand preserved the army from utter destruction. At Germantown he commanded the left wing which penetrated into the village. On 2 March 1778, he accepted the office of quartermaster-general, which he held till August 1780, fulfilling its arduous and complicated duties in such a manner as to call forth from Washington when he left it the declaration «that the States have had in you, in my opinion, an able, upright and diligent servant.» On 23 June 1780 he checked with two brigades and a small body of militia the advance of a corps of 5,000 of the enemy in the brilliant battle of Springfield. He was in command of the army during Washington's visit to Hartford in September 1780, when Arnold's conspiracy was discovered, and sat as president of the court of inquiry upon Major André. In October of the same year, he was appointed to the command of the Southern army, which he found on his arrival, in December, in a state of utter disorganization and want. He soon advanced to a well-chosen camp on the banks of the Pedee, and began a series of operations which in less than a year stripped the enemy of nearly all their hard-won conquests in the two Carolinas and Georgia, and shut them up within the narrow limits of Charleston and its immediate neighborhood. Among the events of this active year were the battle of the Cowpens, won by General Morgan at the opening of the campaign; a brilliant retreat from the Catawba to the Dan; the battle of Guilford Court House in which he lost the field, but gained the end for which he fought; the pursuit of Cornwallis to the Deep River; the daring advance into South Carolina; the battle of Hobkirk's Hill, a second defeat followed by the results of victory; the siege of Fort Ninety-six, raised by the advance of Lord Rawdon, but followed by the immediate evacuation of the post and the retreat of the enemy toward the west; the drawn battle of Eutaw Springs, and the advance upon Dorchester, spoken of by Washington as another «proof of the peculiar abilities» of General Greene. Congress presented him with a medal for services in the battle of Eutaw Springs, and North and South Carolina and Georgia made him valuable grants of property. He removed to the estate of Mulberry Grove, on the Savannah River, Georgia, where he died of sunstroke. Consult G. W. Greene, 'Life of Nathanael Greene' (1867–71); F. V. Greene, 'General Nathanael Greene,' (in 'Great Commanders,' 1893); McCrady, 'History of South Carolina in the Revolution' (1902).

GREENE, Nathaniel, American journalist: b. Boscawen, N. H., 20 May 1797; d. Boston, Mass., 29 Nov. 1877. At 12 he entered the office of the *New Hampshire Patriot,* published at Concord, and at 15 became editor of the *Concord Gazette.* After editing papers at Portsmouth, N. H., and Haverhill, Mass., he removed to Boston, where he established a new Democratic paper known as the *Boston Statesman,* and published semi-weekly, its first appearance being on 6 Feb. 1821. During the administration of J. Q. Adams it was opposed to the almost unanimous sentiment of the city and State; but in 1829, when the general government passed into the hands of the Democratic party, President Jackson appointed Greene postmaster of Boston. He held the office for 12 years without interruption, and, although removed in 1841, was reappointed to it by President Tyler in 1844, and held it until 1849. In 1836 he translated a 'History of Italy' from the Italian of Sforzozi, which was followed by the translation of two volumes of 'Tales from the German' (1837). In 1843 he published 'Tales and Sketches from the French, German and Italian.'

GREENE, Robert, English writer: b. Norwich, 1558?; d. London, 3 Sept. 1592. The greater part of his career is conjectured from his more or less autobiographical novels and pamphlets. He entered Saint John's College, Cambridge, in 1575, and took his B.A. in 1578, Already in his college years, perhaps earlier, he had entered heartily into the dissipation for which he was notorious, though perhaps his own record of himself and that left by his enemy Gabriel Harvey, may both be exaggerated. Upon leaving college he seems to have traveled extensively abroad, learning, from his own account, far more evil than good. Shortly after his return to England he heard a sermon in Saint Andrew's church, Norwich, which strongly moved him to repentance, but he soon recovered his usual recklessness. The incident, however true, is characteristic of him; his excesses alternated with highly emotional confessions of penitence, which were probably quite sincere. The original fineness of his spirit was little harmed by his wild courses; his writing throughout is remarkably pure-minded. In 1580 ‘Mamilia,’ his first novel, was registered; it was published three years later. It seems that he was then studying medicine at Cambridge, where he took his M.A. in 1583. Within two years afterward he married a woman of good family. After their one child was born, Greene deserted her and gave himself up to a wild life in London. It has been pointed out that the character of the patient, deserted wife recurs through his writings, as though the woman he had wronged was always in his mind.

Greene's first occupation in London was the writing of prose romances, varying between the type of Sidney's ‘Arcadia’ and Lyly's ‘Euphues.’ His success in this kind of writing was immediate. He had a better narrative faculty than either Sidney or Lyly, and in addition to an unusual facility in composition he had something of the journalist's skill in finding the interest of the moment. Before 1590 he had written ‘Penelope's Web,’ ‘Euphues, his Censure to Philautus,’ ‘Alcida,’ ‘Greene's Metamorphosis,’ ‘Perimedes the Blacksmith,’ ‘Orpharion,’ ‘Pandosto,’ ‘The Spanish Masquerado,’ ‘Menaphon’ and ‘Tullies Love.’ He had also made many good friends. Nash he had known before; now he met Lodge and probably Marlowe. But at the same time he was living a strangely profligate life, among thieves and outcasts, his special comrade being their chief, Ball, who ended his career at Tyburn. Ball's sister was Greene's mistress, the mother of his son Fortunatus.

In 1590 appeared ‘The Cobbler of Canterbury,’ a collection of six coarse tales, ascribed to Greene. Greene repudiated the book in a pamphlet, ‘Greene's Apology,’ announcing his intention to write no more such romances as might make him seem the likely author of ‘The Cobbler.’ As further expressions of this characteristic repentant mood appeared in the same year his ‘Mourning Garment’ and ‘Never Too Late,’ and in 1591 ‘Farewell to Follie.’ Within the next year he wrote his five pamphlets on “cosenage” or “coney-catching”—descriptions of the lives and methods of thieves and cutpurses; for his material he drew on his own experience and observation, and the pamphlets present pictures of astonishing realism. His old companions, whom he had now turned on, are said to have tried to kill him.

In a satire on the social evils of the times, ‘A Quip for an Upstart Courtier’ (1592), Greene took occasion to insult Gabriel Harvey and his two brothers, one of whom, Richard, in a pamphlet on the Martin Marprelate Controversy, had spoken harshly of Greene and his friends. The wrath of the Harveys was turned upon Greene, and pursued him even after his death, in Gabriel Harvey's ‘Four Letters and Certain Sonnets especially touching Robert Greene’—a cruel account of Greene and of his last hours.

The first play of Greene's, according to the most recent scholarship, was ‘Alphonsus,’ about 1591, an imitation of Marlowe's ‘Tamburlaine’; the second was probably the ‘Looking Glass for London and England,’ in which some of the material of the “coney-catching” pamphlets is reflected. Before 1592 he had written the ‘Orlando Furioso,’ ‘Friar Bacon and Friar Bungay,’ and ‘James IV of Scotland,’ probably in that order.

At the end of the year 1592 Greene fell ill, and with death at hand his better nature reasserted itself. On his deathbed he wrote or completed his ‘Groatsworth of Wit Bought with a Million of Repentence’ and ‘The Repentence of Robert Greene,’ which were published shortly after his death. His affecting letter to his wife, whom he now remembered; the pathetic squalor of his death scene in the shoemaker's house; his ironical request to be crowned with bays — complete one of the romances of literary biography.

Greene is an important figure in the history of the English novel, drama and lyric. His amorous romances are in the Euphuistic style and their subject matter is Arcadian; but Greene's vital interest in life at first hand and his humor tend to humanize the artificial manner and to bring the content of the stories out of the pastoral glamour into a natural world. The pastoral habit of beauty is perilously near shipwreck in the passage in ‘Menaphon’ where the shepherd and his jealous mistress, Pesana, begin to quarrel with true rustic energy and frankness; and the same genius for realism found its opportunity in the later “coney-catching” pamphlets, which, though formless, practically have the interest of the picaresque tale. The delicacy of his feminine characters, however, proves Greene's sympathy with the courtly world of beauty that his realistic power helped to supplant.

Greene's dramatic work, with the exception of ‘Friar Bacon and Friar Bungay’ and ‘James IV of Scotland,’ is unimportant, but in the first of these better known plays he is clearly a forerunner of Shakespeare; as in the romances he represents a transition from the serious drama, religious or heroic, to a realistic mingling of moods and themes; and his country folk belong to England, not to Arcadia.

His real fame rests on the lyrics in the romances. These songs, like those in the ‘Arcadia,’ all highly wrought, are quite without Sidney's pedantry; they are at times stately, as in “Doron's Description of Samela,” or pathetic. as in “Sephestia's Song to Her Child,” or metrically ingenious, as in Menaphon's song, “Some Say Love”; but they all have a certain silvery music, a tone of dignity without heaviness, which in its peculiar quality is found only in Greene. Lodge's lyrics are the only examples that can be compared with his. In ‘Rosalind’ the famous “Love in My Bosom Like a Bee” is perhaps smoother than anything in Greene; and “Rosalind's Description” is the best example of Lodge's rich, pictorial coloring. But Lodge's art, though finer, is less directly human than Greene, whose lyrics, like the account of his career, stir one with a sense of the actual man.

Bibliography.— The best complete edition is that by Grosart, 'The Huth Library'; the best edition of the plays and poems is that by Churton Collins (1905). For biography and criticism consult 'Introductions' to above and the work by T. H. Dickinson (1909).

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GREENE, Samuel Dana, American naval commander: b. Cumberland, Md., 11 Feb. 1840; d. Portsmouth, N. H., 11 Dec. 1884. Graduated at the Naval Academy in 1859, he volunteered in January 1862 to serve as executive officer of the *Monitor,* whose capabilities were then untested, and during the engagement of the *Monitor* with the Confederate ram *Merrimac* in Hampton Roads, he commanded the vessel on account of an accident to Captain Worden, his superior. After the war he was a professor at the Naval Academy for 10 years.

GREENE, Sarah Pratt McLean, American novelist: b. Simsbury, Conn., 3 July 1856. She was educated at Mount Holyoke, Mass., and for several years taught school in Plymouth, Mass. In 1887 she was married to F. L. Greene. She has published 'Cape Cod Folks'; 'Towhead, the Story of a Girl' (1884); 'Lastchance Junction' (1889); 'Leon Pontifex' (1897); 'The Moral Imbeciles' (1898); 'Vesty of the Basins' (1900); 'Flood Tide' (1901); 'Winslow Plain' (1902); 'Deacon Lysander' (1904); 'Power Lot' (1907), and numerous short stories in *Harper's Magazine.*

GREENE, William Batchelder, American author: b. Haverhill, Mass., 1797; d. 1877. He received his education at West Point, served in the Florida War and then prepared himself for the Unitarian ministry at the Harvard Divinity School. He rose to the rank of brigadier general of volunteers during the Civil War, resigning in 1862. He wrote 'The Sovereignty of the People' (1863); 'Transcendentalism' (1870); 'Theory of Calculus' (1870); 'Socialistic, Communistic, Mutualistic and Financial Fragments' (1875).

GREENFIELD, Ind., city, county-seat of Hancock County, on the Pittsburgh, Cincinnati, Chicago and Saint Louis Railroad, 20 miles east of Indianapolis. It has foundries, machine shops and manufactures of bricks, jars, bottles, glass, paper, stoves, etc. It has a fine high school building and a public library. Greenfield was incorporated in 1876. The government is vested in a council and mayor elected for a term of four years. The waterworks and electric-lighting plants are owned by the city. It is the birthplace of James Whitcomb Riley (q.v.). Pop. 4,448.

GREENFIELD, Mass., town, county-seat of Franklin County; on the Connecticut River, the Boston and Maine Railroad; about 34 miles north of Springfield. Greenfield was once a part of Deerfield, but in 1738 it petitioned for a separation which was not granted until 1743. Greenfield and vicinity has many famous historic associations. The massacre of Deerfield occurred in the winter of 1704. The town has fine public schools, libraries and parks and it is the centre of trade for Franklin County towns. Assessed valuation, $14,000,000; savings bank deposits, $10,000,000; trust company and national bank with $3,000,000 deposits. The chief manufactures are machinery, cutlery, paper, boxes, wooden-ware, bricks, toys, children's carriages. Pop. 13,000.

GREENFIELD, Ohio, a city of Highland County, on Paint Creek, 75 miles northeast of Cincinnati, on the Baltimore and Ohio, Southwestern and the Detroit, Toledo and Ironton railroads. The principal manufactures are sweat collar pads for horses, show cases, cans of various kinds and wooden-ware novelties. It received its charter in 1850, about 50 years after its foundation. It has a high school building and is governed by mayor and city council. Pop. 4,500.

GREENFINCH, or **GREENLINNET,** one of the most common and beautiful of European finches (*Ligurinus chloris*). The general color of the male is olive-green; primaries grayish-black, with bright yellow edges; under parts yellow; female brownish. Although its song is uninteresting it is a favorite cage-bird in Germany. In Texas a greenish towhee bunting is locally called "green-finch."

GREENHALGE, Frederick Thomas, American statesman: b. Clitheroë, England, 1842; d. Boston, 1896. When he was quite young his parents emigrated to the United States and after studying for a few years at Harvard University he joined the Commissary Department of the Federal Army at Newbern, N. C. On his return north he studied law and was admitted to the bar in 1865. In 1879 he became mayor of Lowell and served for two terms. He sat in the Massachusetts House of Representatives in 1884 and became a United States Congressman in 1888. His last office was that of governor of Massachusetts, which he held from 1894-96. Consult Nesmith, 'The Life and Works of Frederick Greenhalge' (Boston 1897).

GREENHILL, Sir George, English mathematician and physicist: b. 1847. He was professor of mathematics in Artillery College, Woolwich; a member of the Aeronautical committee and associate member of the ordnance committee. He has published 'Differential and Integral Calculus with Applications' (1885); 'Applications of the Elliptic Function' (1892); 'Hydrostatics' (1894); 'Notes on Dynamics' (1908); 'Report 19, Theory of a Stream Line with Application to an Aeroplane' (1910); 'Dynamics of Mechanical Flight' (1912); 'Report 146, Gyroscopic Theory' (1914).

GREENHOUSE. In America the term greenhouse is loosely applied to all glass structures, except cold frames and hot beds, in which plants are grown. In Great Britain it is almost limited to those buildings in which living plants that do not demand high temperature are stored or grown. Etymologically and as originally used the word included all structures, even storage "pits," in which plants were placed to be kept alive or protected during winter without the intention that they should grow.

The modern greenhouse is the product of a long evolution from two sources. It appears to have started on the one hand as a window garden in the human residence, the first step toward the greenhouse as now known being an enlargement of the glass area. Next came the extension of the window into an oriel or a «bay.» When the glass roof was added the greenhouse may be said to have fairly begun its pedigree. The other line of descent traces its course back to the European practice of growing fruit trees and vines against brick or stone walls, partly as a protection against inclement weather and partly because such walls absorb sun heat and thus help to hasten or insure the maturity or higher quality of the fruit. As far back as the 16th century this was a popular practice upon the estates of the wealthy. In 1699 Nicholas Facio Duilhier, a mathematician, wrote a book entitled 'Fruit Walls Improved' in which he contended that by tilting the walls at right angles to the sun the heat would be increased. In 1724, however, Stephen Switzer proved and wrote that such walls gave no better results than ordinary perpendicular ones. Over some of the walls at Belvoir Castle glass sash were placed in front of the walls and over the vines as extra protection. Heating flues were built behind the walls to supply additional warmth. The success of this experiment led Switzer to build walls with glass fronts three and one-half feet away as described and pictured in 'The Practical Fruit Gardener' (1731). Switzer's claim that the introduction of these structures led to improvement of glassing and forcing grapes is more than supported by Johnson, who writes ('History of Gardening') that the use of such walls «led to the first erection of a regular forcing structure of which we have an account.» From the covered wall the first step toward a «greenhouse» was the «lean-to» and from that by many gradations to the modern forms.

In America improvements in greenhouse construction began to appear about 1800. This was mainly due to the necessity of better caring for the plants imported from foreign countries by John Bartram and his followers, to the improvements in heating appliances and to the general betterment of architecture. However, in the light of the present these improvements are crude, cumbersome and even ludicrous; for instance, the device described and illustrated by Loudon ('Treatise on Several Improvements Recently Made in Hot Houses,' 1805), whereby fresh air was to be forced into the greenhouse by means of a bellows!

The principal types of greenhouses may be described according to their function as follows: The conservatory, in which plants that have been grown elsewhere (generally in other greenhouses) are brought for display when they have reached perfection; the forcing house in which plants, especially certain vegetables are grown out of their normal season; the warmhouse, or as known in England the «stovehouse,» in which tropical and other heat-loving plants are grown; and the propagating-house, in which plants are grown from seeds, cuttings, layers, grafts, etc. The term «stovehouse» is derived from the original practise of heating such a structure by means of a brick stove. Hence it applies to the warmest part of the greenhouse. In America the term warmhouse is in general use though among foreign-trained gardeners the term «stove» used alone is frequently heard.

Greenhouses may also be classified according to their forms of which the following are the most popular: The lean-to, which consists of one low and one high wall with one slope of glass connecting them; the even-span, which consists of walls of even height and two roofs of equal length and slope; uneven span, in which the walls may be of unequal height but one of the roofs of both different length and different pitch from the other; the curvilinear, in which the walls are of equal height, the roofs of even pitch but curved more or less. The first three are all used in commercial structures, the last, because expensive to erect and maintain, only for the pleasure of the owners.

As now constructed commercial greenhouses are built upon severely plain and simple lines. Dimensions vary considerably, but common ranges vary from 10 to 80 or more feet wide, 50 to 500 feet long and five to seven feet high at the walls inside. Great stress is laid upon the slope of the glass so as to take advantage of the inclination of the sun at various times of the year.

Until the closing quarter of the last century wood was extensively used for the framework, walls and many other parts of greenhouses. Objections to it are that in roof parts it is so bulky that it casts too heavy shade in walls and trenches, it quickly decays because of the excessive moisture and that for this reason it demands frequent repair and renewal. Objections to metal in roofs are its excessive contraction and expansion with changes of temperature and the consequent breakage of glass. Most modern greenhouses therefore combine concrete, brick or stone walls with metal posts, beams and purlins with wooden rafters upon which the glass rests. The most favored because most durable woods are Southern States cypress and California redwood. To increase durability, to lessen damage to glass and leakage into the interior, houses are generally built nowadays singly, that is, with an alley between rather than attached from end to end. This plan also favors drainage and convenience in filling the houses with soil or in emptying them. Thus the increased cost of walls is offset by the reduced cost of maintenance. Where greenhouses are built «ridge-and-furrow» style the gutters are generally made of metal and warmed from below by hot water or steam pipes to melt the snow and ice quickly and thus reduce or prevent leakage and damage.

Great care is exercised by greenhouse builders in selecting glass for the roof. Three qualities are sought for; least obstruction to sunlight, strength to withstand wind, storm and especially hail and freedom from defects that tend to form lenses and thus burn the foliage of plants grown beneath. Clear white single thick glass, while it allows 60 to 70 per cent of light to pass through is too frail to be safe. It is also dulled by exposure to the air. Common green glass (so called because green in cross section) allows only 52 to 55 per cent light passage, but it does not readily tarnish. Double thick green glass permits 50 to 52 per cent of light to pass. Because double thick glass is stronger and because its chemical formation is such that it is little affected by the atmosphere it is considered best for greenhouse roofs.

The visible defects such as «stones, bubbles

GREENHOUSE.

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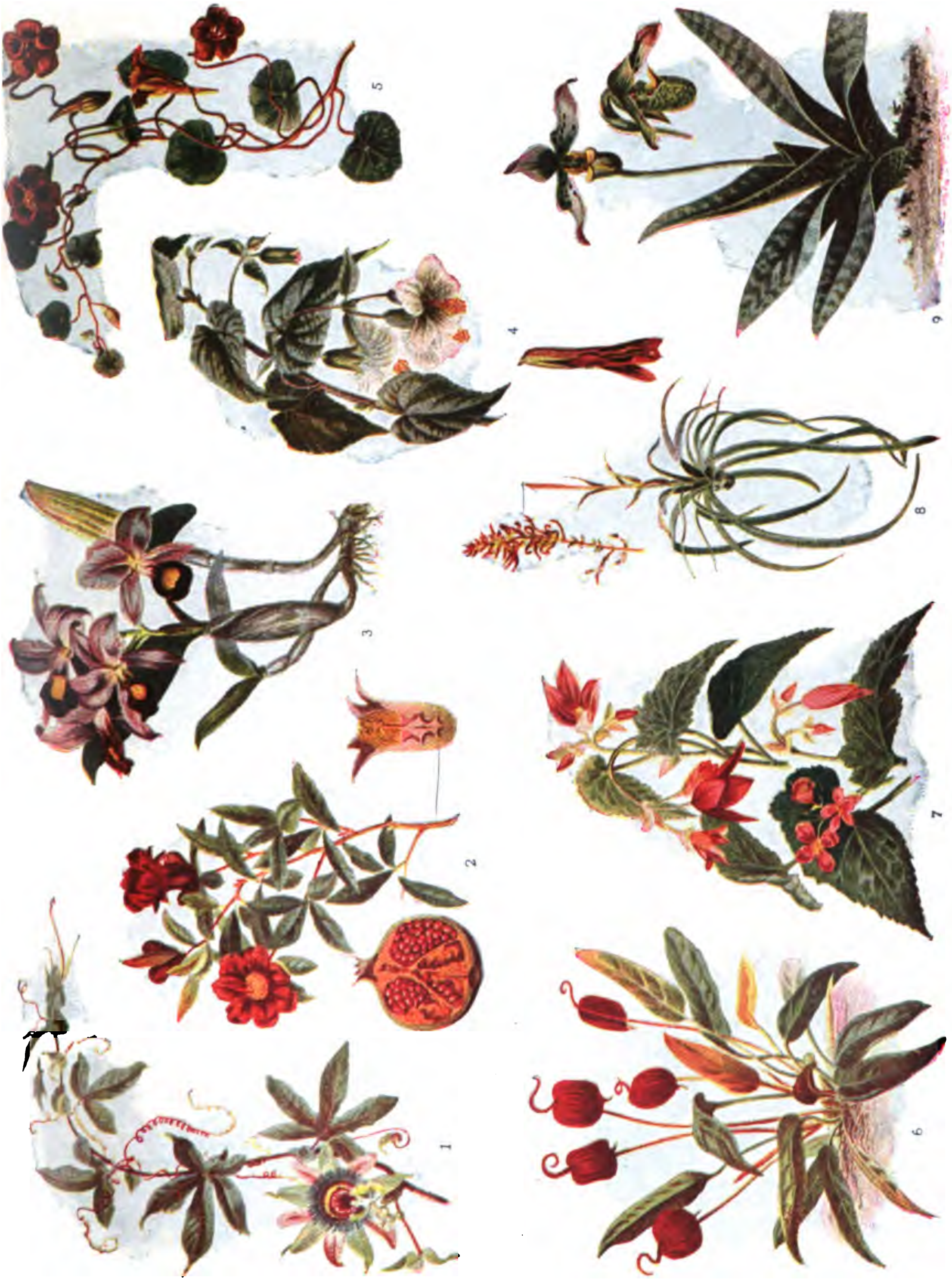
GREENHOUSE FLOWERING PLANTS



1. Blue Passion-flower (P. cœrulea). 2. Pomegranate, with opened fruit and flower. 3. An Orchid (Cattleya). 4. Abutilon (A. insigne). 5. Monkshood (Tropælium). 6. Anthurium (A. scherzerianum). 7. Begonia (B. bolivensis). 8. Pitcairnia (P. furfuracea). 9. Ladies' Slipper (Cypripedium venustum).

and "blisters" are popularly believed to produce burning; but this is erroneous. J. C. Blair in 1895, after careful experiment, proved this a fallacy. (Bulletin 95, Cornell University Agricultural Experiment Station). Bubbles and blisters are generally thinner in the centre than at the circumference, hence they form concave, not convex, lenses and thus they actually spread the light rays instead of focusing them. While "knots" and "sand stones" may be convex lenses their foci are almost invariably very close to the glass — a few inches — hence they are powerless to damage plants several feet below. The real cause of burning damage is the prismatic or lens-like effect due to variation in thickness in the pane as a whole or in large part thus focusing the light rays at 5 to 30 or more feet below the glass. Such defects may be found in all grades of glass, domestic or foreign alike. They can rarely be detected by the eye but may be easily discovered by testing in sunlight or by a micrometer caliper.

Ample ventilation is essential to success in growing greenhouse crops. Usually about one-tenth of the roof is arranged to be opened at the top. It is generally desirable also to have ventilation at the sides, more especially for summer use when fresh air is especially needed not only for the health of the plants but for the comfort of the workmen. It is highly desirable in large houses to provide ventilators on each side of the ridge, each set opening by independent apparatus. This will allow of ventilating on the lea side during stormy or windy weather. It is also well to have separate lifting apparatus for each 75 or 100 linear feet of ventilators, not only to make for ease of manipulation but to allow of ventilating one part independently of the others. Preference is given to the plan of hingeing the ventilators to the ridge pole so as to open from their lower sides, rather than to the plan of hingeing them below so as to open at the peak. By the former method the air enters with less draft and rain and snow are kept out better than by the latter plan.

Five systems of heating greenhouses have been in use. The oldest and simplest is the flue. Except in the propagation of sweet potato plants and in very small places where fuel and labor are cheap it has given place to one of the other four. Hot water under low pressure or in the open tank system is still used in small establishments such as private conservatories; water under high pressure or in practically closed circuits, as in larger but not the largest commercial places; low pressure steam or the so called vacuum or vapor system, more or less adaptable to any sized establishment; and high pressure steam, most popular in the very large greenhouse ventures. Low pressure hot water employs large cast iron pipes "leaded" at the joints. It is too cumbersome and too limited in its adaptability for commercial practices. In the other three systems smaller sized wrought iron pipes are screwed together and carried wherever desired beneath or above the benches. All three of these systems when properly installed give good results. Which one shall be chosen is largely a matter of individual establishment and personal requirement. The open tank hot water system is more elastic than the others in its adaptability to general lay-outs and in the ease with which it may be managed. Once started, its operation is practically automatic for periods of 6 to 10 hours without attention. High pressure water and the steam systems demand much more constant attention because the temperatures rise and fall far more quickly.

While the principles of greenhouse construction have been made the study of skilled engineers and architects who confine their efforts to this class of work greenhouse management has from the beginning until the present been almost wholly by rule of thumb. Thus progress has been slower than had fundamental principles been understood and applied. These principles naturally divide themselves into two groups: those that apply to the plants themselves and those that apply to the management of the greenhouse.

Among those principles of the former group the following are perhaps the more important: (1) Every species of plant has its own season of flowering. Most failures to secure flowers are due to ignorance or disregard of this principle. By knowing the natural season of bloom and by supplying conditions as nearly natural as possible to the plant, success is almost sure to follow. The number of plants that can be made to blossom at abnormal times are few as compared with the whole number of species grown in greenhouses. (2) Most plants need a period of rest. This natural demand is due to the natural upbringing of each, due usually to the approach of weather too cold, too hot or too dry for the plant to continue action. Plants that do not need such rest are the exception, not the rule. (3) Most of the plant's growth should have been made before bloom should be expected. In other words the vegetable cycle must be complete or at least far advanced before the reproductive one should be looked for. (4) A check in vegetative growth, without impairment of health, induces blooming and fruitfulness. To illustrate: by frequent shifting of plants from smaller to larger flower pots the blooming time may be delayed; but by stopping the shifting when the plants have attained the desired size flowers will soon appear. Once started into bloom plant food may be given as freely as the plant may need it. (5) The plant's habitat is a reliable index of the treatment needed. The more nearly the grower can imitate the natural home of the plant the more likely is he to succeed. (6) The best method of propagation must be learned for each species; usually, however, quicker results and sturdier plants will develop from cuttings than from seeds.

Among those principles that relate to the greenhouse the following take lead: (1) As nearly as possible conditions in the greenhouse should imitate a natural day — light full and continuous, temperature waxing toward and waning from midday with a minimum night registration of 10 to 15 degrees below the shade maximum during the day. (2) Each plant must receive individual attention. Space is too costly to slight anything. (3) Prevent damage by foes — insects, fungi, bacteria, worms, etc. Preventive sanitation favors success. (4) High temperature and ample water make for rapid, sappy growth. Hence greater care is needed to prevent injury to the plants. Disease is more likely to attack such plants than those grown under lower temperature and with less water. (5) In cloudy weather plants naturally grow slowly. Therefore in the greenhouse reduce heat and water and give more ventilation. (6) Water only when the plants need watering, but water copiously then. An occasional drench is far better than a frequent dribble because it wets the whole of the soil and the plants get some good of it. This they do not get when only the surface is moistened. (7) Water in the greenhouse as the temperature rises, never as it falls. Watering tends to cool the plants and the atmosphere, hence may work damage when the temperature is declining. (8) Water early enough in the day so the foliage will be dry before evening. (9) Water little if any in dull and muggy weather. (10) Use soil well supplied with sand and vegetable matter. These materials tend to counteract the puddling effect of watering soils in which there is clay. (11) Ventilate both to lower temperature and reduce moisture in the greenhouse. This is more important than the admission of "fresh" air, enough of which enters through cracks and doors. (12) When admitting air avoid drafts especially of cold air. Hence have ventilators as far from the plants as possible and allow the air to enter through numerous small openings rather than fewer large ones. (13) Provide shade in summer to reduce both heat and light. This will tend to prevent spindly development of the plants.

Bibliography.—Dean, 'System of Greenhouse Heating' (1901); Hatfield, 'Greenhouses for Amateur Growers' (1898); Herendeen, 'Competition in Greenhouse Heating' (13 essays, 1893), and 'Greenhouse Management' (1898); Rexford, 'The Amateur's Greenhouse' (1900); Taft, 'Greenhouse Construction' (1893); Wright, 'Greenhouses, their Construction and Equipment' (1917).

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GREENHOUSE INSECTS. Plants cultivated under glass are as subject to insect depredations as are those growing in the garden and orchard, unless the greatest care is exercised. In addition to many species of foreign origin, such as numerous kinds of scale-insects (q.v.) and aphides which are constantly being imported with exotic plants, we have native insects firmly established as indoor pests. One of the commonest and most destructive is the black scale (*Lecanium oleæ*), which is also a pest of importance in groves of citrus fruits and olives. The related hemispherical scale (*Lecanium hemisphæricum*) is still more distinctively a greenhouse pest; and several injurious orchard scales and mealy bugs (q.v.) are likely at any time to become so, but all may be controlled by fumigation with hydrocyanic-acid gas. The "white fly" (q.v.), which name, as used by florists, covers a number of species of *Aleyrodes*, is to be similarly treated.

Many plants grown artificially are attacked also by omnivorous greenhouse pests, such as the red spider (*Tetranychus telarius*) and the greenhouse leaf-tyer, and by general field and garden pests such as cutworms, wireworms and white grubs. The greenhouse leaf-tyer (*Phlyctania rubigalis*) is less affected by fumigation than most insects, and, with other caterpillars, can be successfully controlled only by hand-picking, clipping off and destroying the affected leaves, and by spraying with arsenical mixtures.

Roses are peculiarly subject to insect injury, and there are several specific indoor rose pests, such as Fuller's rose beetle (*Aramiges fulleri*), which also attacks azaleas, begonias, lilies, primrose, geranium, canna and others. It appears to be nearly immune to insecticides in the adult condition; one must, therefore, employ hand methods, collecting and destroying the beetles, preferably in November and December, when they congregate on various plants. Injured plants should be pulled out, and the larvæ about them destroyed with kerosene emulsion or bisulphide of carbon. Numerous leaf-rollers, bed-worms and leaf-tyers (qq.v.) are very injurious to the rose, by eating into the buds just before blossoming. Roses are seriously injured at times by gall-flies and by the rose-scale (*Aulacaspis rosæ*), and other scale insects. Violets cultivated under glass are much injured by insect pests, principally by the black or brown aphis (*Rhopalosiphon violæ*), violet gall-fly (*Diplosis violicola*), violet saw-fly (*Emphytus canadensis*), and the red spider, and greenhouse leaf-tyer. The black aphis is still restricted and dependent on commerce for carriage from one greenhouse to another, but has caused losses of thousands of dollars to single firms. It may be controlled by fumigation with hydrocyanic-acid gas, which also destroys the saw-fly and the gall-fly (properly a gall-gnat, q.v.) which attacks the leaves while they are young, the larva or maggot developing in folds, incorrectly termed "galls." Tobacco preparations and bubach insect-powder are also useful against these minute pests.

GREENLAND. The most northerly of the Arctic colonies of Denmark, a country unique in several respects. It is the largest known island, after the island continent of Australia, the most northerly land of the earth, the only ice-capped region occupied by man, and has the northernmost settlements of the world.

Area and Physiography.—Its area is not accurately known, but probably approximates 750,000 square miles, estimates varying from 512,000 to 825,000. It extends over 1,600 miles north and south, from Cape Farewell in latitude 59° 45′ N. to Cape Jesup, about 83° 35′ N. latitude, and about 900 miles in width from east to west near the 78th parallel. The country is a high plateau, generally ranging from 2,000 to 6,000 feet in elevation, while the dividing central crest varies from 5,000 to 9,000 feet. It is covered, except at the very edge of the surrounding seas, by an unbroken ice-cap of glacier, known usually as the inland-ice, which averages a thickness of a thousand feet or more. Here and there above the surface of the ice-cap emerge ice-free peaks, among which the highest recorded are Tiningertok, near Cape Farewell, 7,340 feet; Petermann, near Franz Josef fiord, about 8,500 feet; and Forel, near the centre of South Greenland, 9,050 feet. The continuity of the inland-ice has been determined by the journeys and crossings of Nordenskiöld, 1870 and 1883; Jensen, 1879; Peary, 1886 and 1892; Nansen, 1888; Garde, 1892; Mylius-Erichsen, 1902; Quervain, 1913; and Koch, 1913. Vast ice-streams flow continuously from the inland-ice into the adjacent seas, largely through the fiords, of which Greenland presents the most extensive and most remarkable system in the world. These fiords number hundreds in all, have very deep water and penetrate the country far inland. The diverging fiords of Scoresby Sound terminate 163 miles from the ocean. The most important fiords on the southeast coast are Franz Josef and King Oscar; on the northeast Danmark; on the southwest, Godthaab, Uminak, Jacobshaven, Torsukatak and Inglefield; and on the northwest facing the Arctic Ocean, Peterman, Sherard, Osborn and De Long At intermediate points between the fiords the inland-ice flows directly into the sea at hundreds of places. On the east coast Garde discovered more than 200 such streams, where the precipitous sea-face of the glacier was more than a mile wide. In Kane Sea, on the northwest, Humboldt glacier presents some 60 miles of sea-front. The only ice-free regions are coast lowlands and the outlying islands. Such spaces rarely exceed 50 miles in width between sea and ice, and usually are barren wastes.

Climate.— The temperatures are arctic, frosts occurring occasionally over the whole country in midsummer. Summer temperatures vary little from Cape Farewell to the Arctic Ocean, but the absence of the sun — lasting four months in the extreme north — causes larger differences in winter. The three warmest and coldest months show average temperatures as follows: Ivigtut, 61° N., summer, 48, winter, 21 degrees; Godthaad, 64° N., 39 and 12 degrees; Upernivik, 73° N., 38 and —4 degrees; Thank God Harbor, 82° N. (deduced from Fort Conger) summer, 35, winter, —37 degrees.

Icebergs.— The great fiords have very deep water, long shore-lines, and precipitous sides, often sheer and at times as high as 4,000 feet. Such conditions facilitate the detachment, or calving, of great bergs from the parent mass. Many thousands of icebergs are thus formed each year, the larger number on the east coast, where, however, the set of the Spitzbergen current keeps most of them stationary. Others are carried by prevailing currents around Cape Farewell, and thence north into Melville Bay. From these waters the icebergs are finally sent south by the current along the west water, and thus furnish the great ice fields of the Atlantic, off Labrador and Newfoundland. The most astonishing of the ice-berg producers are the Torsukatak and Jacobshaven fiords of southwestern Greenland. The latter fiord was estimated by Rink (author of 'Danish Greenland') to have an average *daily* outflow of between 8,000,000 and 15,000,000 cubic meters of ice. Icebergs as long as 10 miles or more have been reported from Melville Bay, with heights of other bergs ranging from 50 to 250 feet above the water. Unlike the adjacent island, Iceland, Greenland has no volcanoes. Geysers are also absent, the hottest springs being those on Anortok Island, in extreme south Greenland, 60° 29′ N. latitude, where the highest temperature of the water is 108 degrees.

Fauna and Flora.— The animal and plant life of Greenland pertain rather to American than to European forms. The reindeer, white hare, Arctic fox, ermine and polar bear are generally distributed, while the wolf and musk-ox are seen occasionally in northern Greenland. Hagerup, a Danish ornithologist, records 139 species of birds in Greenland, of which only 61 species are denizens of the country. Gunnar Anderson places the Greenlandish floral species at 286, only 60 per cent of the recorded species of Iceland.

Agriculture and Industries.— Short summers and severe climate forbid agriculture, except in gardens of Danish officials, where are raised with difficulty carrots, lettuce and turnips. The only industries are the domestic curing of skins and rendering of oil from the sea-game killed by the natives.

Government.— Danish authority was formerly limited to the southern portions of Greenland. In 1917, however, the United States ceded, in part payment for the Danish West Indies, its right to any and all parts of Greenland acquired through discovery or temporary occupation. Under this treaty Denmark now dominates all Greenland. Its royal officers control the administration, religion and education of the native population. Greenland is divided for administration into the North and the South Inspectorates, each being governed by a Royal Inspector appointed by the King of Denmark. Besides exercising magisterial powers, the Inspectors supervise the agents of the Royal Greenland Trade Commission, the Danish and the Moravian missions, and subserve the interests of the Eskimo. The outcome of this efficient administration has been extraordinarily successful. The Danish Eskimo form one of the few subject races that have passed under the domination of civilized nations without suffering decadence and gradual extinction. In late years the field of administration has been considerably extended through the inclusion under Danish control of the widely separated Eskimo of the Angmagsalik district, in 65° 37′ North latitude, on the east coast, and of the Etah natives between the parallels of 76 and 78 degrees on the west coast. The future welfare of these isolated communities is thus assured.

Home government exists among the Eskimo in the form of municipal councils, which are organized under the regulations formulated in 1872 by the Danish Minister of Home Affairs. The local priest presides, and in the proportion of one to 120 natives Eskimo members are elected from the *providers* (skilled hunters). They adjust minor offenses and relieve distress among the old and suffering through distribution of the Greenland Fund, which is formed by allotment of 20 per cent of all sums paid for domestic produce by the Royal Greenland Trade Commission. The capital of the North Greenland Inspectorate is Godhaven, on Disco Island, the chief settlement in the colony, and that of the South Inspectorate, Godthaab.

Religion and Education.— The Minister of Public Worship of Denmark appoints and pays the officials of the Danish Mission, while the Moravian Mission is maintained by charitable contributions. Religion and education are efficiently fostered by these devoted missionaries.

Literature.—Eskimo is the prevalent speech. For more than 60 years considerable native literature has been published in Greenland, written and printed locally in the dialect. While the publications pertain largely to biblical subjects, hymns, psalms and catechisms, yet they include biography, travel, stories, etc., of popular interest. They are often illustrated lithographically by native artists. Since 1861 an Eskimo periodical has been issued at somewhat irregular intervals.

Commerce and Industry.— The monopoly of the Royal Greenland Trade Commission has existed since 1774. It controls all trade and fixes the price of both domestic products and imported articles. No foreigner can reside in the country, or trade with its inhabitants, except by special permission. Greenland is divided into trade districts, each under a chief administrator — often called governor — with assistants at selected outposts. In 1914 there were exported products to the value of about $260,000. Seal skins and oils formed 70 per cent of the values, and salted fish 12 per cent. The imports from Denmark that year were mostly provisions and clothing, valued at about $140,000. The largest output of cryolite in the world is that of Ivigtut, which is controlled by an American Company under license. In 1915, 4,569 tons of cryolite, valued at $10,000, were shipped to the United States. Other minerals are found in uneconomical deposits. Coal of inferior quality is visible in many places, but is rarely used for fuel (peat being more economical) owing to difficulty of transportation.

Population.— Except a few hundred Danish officials, the population is entirely Eskimo, whose origin is unknown. The inhabited litorals are Danish Greenland, along the southwest coast between Cape Farewell and Tasiausak, 78.6° N. latitude; the Angmagsalik district, at the Arctic circle, east coast; and the Smith Sound coast, between Cape York and Etah. The Eskimo have increased steadily since 1840 when they numbered 8,128. By the last census, 1 Oct. 1911, the population registered 13,459, distributed as follows: North Inspectorate, 102 Europeans, 5,858 Eskimos; South Inspectorate, 280 Europeans, 6,652 Eskimos; Angmagsalik, 10 Europeans, 431 Eskimos. These Eskimos live by seal-hunting, are religious and educated. The isolated Etah natives, not included above, number about 250.

History and Exploration.— Greenland was discovered in the latter part of the 10th century by the Norsemen, who settled the extreme southern portions. The colonies vanished, their fate being one of the mysteries of history. In the course of the search for a Northwest Passage the island was rediscovered, and its west coasts were followed from Cape Farewell to Hakluit Island, Smith Sound, by the voyages of John Davis, 1585–88, and of William Baffin, 1616. Hudson sighted the east coast in his voyage of 1607, and occasionally it was seen by whalers. Greenland again passed out of history until 1721, when the foundation of Danish Greenland was laid through the appointment by the King of Denmark of Hans Egede, a Lutheran, as a missionary. His settlement at Godthaab eventually led to the Moravian and Danish Missions, to the initiation of the Royal Trade, and to the establishment of colonial government. The exploration of the west coast has been completed by expeditions during the past 70 years as follows: Inglefield, 1852, to 78° 28′ N.; Kane, 1853–55, to 80° 35′ N.; Hall, 1870–71, to 82° 9′ N.; Nares, 1876, to 82° 20′ N.; Greely, 1882, to 83° 24′ N.; Peary, 1902, to about 83° 35′, and thence southeast to about 83° N. The exploration of the east coast was due to the Scoresbys, father and son, who reconstructed the cartography of east Greenland by their explorations between latitudes 69° 30′ and 74° N. in 1817–22.

Apart from Scoresby's preliminary work, the east coast has been explored as follows: Graah, 1829, from Cape Farewell to 65° N.; Holm and Knutsen 1884, to 66° N.; Amdrup, 1898–1900, to 69° N.; Ryder, 1892, 69° to 70° 27′ N.; Koldewey, 1870, 70° to 77° N.; Mylius-Erichsen, 1907, to 82° 5′ N.; Koch, 1907, to 83° N. By filling in the 300 miles of unknown coast, Mylius-Erichsen and Koch completed the coast survey of the great island of Greenland.

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GREENLAND WHALE, or **BOWHEAD,** the larger and more restricted of the "right" or whalebone whales of the genus *Balæna* (*B. mysticetus*), which is absolutely confined to the arctic region, reports of its occurrence on other coasts originating in mistaking for it the almost cosmopolitan southern right whale. It grows occasionally to a length of 70 feet, but is usually considerably less; and is black, except a white patch on the under side of the jaw. This whale may yield 275 barrels of oil, and 3,000 pounds of whalebone. It has become comparatively rare through constant pursuit. Its general habits agree with those of its family (*Balænidæ*), for which see WHALE.

GREENLEAF, Charles Ravenscroft, American physician and soldier: b. Carlisle, Pa., 1838; d. 1911. He was graduated at the Ohio State Medical College and served in the Civil War. He rose to the rank of assistant surgeon-general in 1896, was retired in 1902 and appointed brigadier-general in 1904. He saw service in the Spanish American War in Cuba and Porto Rico in the capacity of chief field surgeon; and in 1900 he accompanied Generals Otis and MacArthur as chief surgeon of the Division of the Philippines. He was also professor of public and military hygiene at the University of California for a short time. His publications include 'Manual for Medical Officers'; 'Epitome of Examination of Recruits' and 'A System of Personal Identification' (in Buck's 'Handbook').

GREENLEAF, Simon, American jurist: b. Newburyport, Mass., 5 Dec. 1783; d. Cambridge, Mass., 6 Oct. 1853. He commenced the practice of law in 1806 at Standish, afterward practising at Gray and Portland. He was a reporter of the Supreme Court 1820–32; professor of law at Harvard University 1833–48, succeeding Judge Story in the Dean professorship in 1846; and upon his resignation in 1848 was made professor emeritus. Beside nine volumes of reports of the Maine Supreme Court proceedings he published 'Treatise on the Law of Evidence' (1842–53); 'Principles of Freemasonry' (1820): 'Examination of the Testimony of the Four Evangelists by the Rules of Evidence, as administered in Courts of Justice, with an Account of the Trial of Jesus' (1846). He also edited Cruise's 'Digest of the Laws of England respecting Real Property' (1849–50).

GREENLINGS, a family (*Hexagrammidæ*) of coast-fishes allied to the rose-fishes, many species of which occur abundantly from northern California to Bering Sea, including several excellent and of local importance as food-fishes. They are brilliant in color, yellow and green being prominent; are carnivorous; and seek their food among kelp and about rocks.

GREENMAN, Milton Jay, American anatomist: b. North East, Pa., 1866. He was graduated at the University of Pennsylvania in 1892 and became an instructor in biology there (1889–92) and lecturer on physiology (1892–93). From 1893–1905 he served as assistant director of the Wistar Institute of Anatomy at Philadelphia, becoming director in the last-named year. He was chairman of the board of directors of the Committee on Provision for Feeble-Minded and a member of the board of directors of the Marine Biological Laboratory at Woods Hole, Mass.

GREENOCK, grĕn'ŏk, Scotland, in Renfrewshire, on the south shore of the Firth of Clyde, 22½ miles by rail west-northwest of Glasgow. The Watt Institution contains a marble statue of Watt by Chantrey. The harbor works date from 1707 and have cost upward of $7,500,000. Shipbuilding has been carried on since 1760; sugar refining began in 1765 and there are also manufactures of steam-engines, anchors and chain cables, ropes, sailcloth, paper, wool and worsted, etc. Besides being the birthplace of James Watt (q.v.), famous because of his work on steam-engines, of Spence the mathematician and of Principal Caird, it has memories of Rob Roy, John Wilson and Galt, and contains the grave of Burns' «Highland Mary.» Pop. about 70,000.

GREENOCKITE, or CADMIUM BLENDE, a native sulphide of cadmium, having the formula CdS, and crystallizing in hemimorphic forms belonging to the hexagonal system. It is transparent, or nearly so, and yellow, with a vitreous or resinous lustre. It turns carmine when heated in a closed tube, returning to its original color upon cooling; and it dissolves in hydrochloric acid, with liberation of sulphuretted hydrogen. Greenockite is brittle and has a hardness of from 3 to 3.5, and a specific gravity of about 5.0. In the United States it is found in Marion County, Ark., in the zinc-bearing districts of southwestern Missouri and in a zinc mine in Lehigh County, Pa.

GREENOUGH, George Bellas, English geologist: b. London, 1778; d. 1855. He studied at Saint Peter's College, Cambridge, at Göttingen and at Freiburg, where Werner was his teacher. In 1807 he became a Fellow of the Royal Society, and assisted in founding the Geological Society of London in 1807. He was the first president of this organization (1811–17) and served again in 1818 and 1833. He represented Gatton in Parliament from 1807 to 1812. Among his publications are 'A Critical Examination of the First Principles of Geology' (1819); 'Geological Map of England and Wales' (2d ed., 1839), and 'Geological Map of India' (1854).

GREENOUGH, Horatio, American sculptor: b. Boston, 6 Sept. 1805; d. Somerville, Mass., 18 Dec. 1852. When he entered Harvard at 16 he had already modeled in clay and attempted sculpture. A French sculptor named Binon, resident in Boston, was his first master. During his college career he enjoyed the friendship and advice of Washington Allston and produced the design from which the present Bunker Hill monument was erected. He was graduated in 1825 and went to Rome with letters to Thorwaldsen. He returned to Boston in 1826, and after modeling busts of John Quincy Adams, Chief Justice Marshall and others, again went to Italy and established his studio in Florence. His first commission was from James Fenimore Cooper, for whom he executed his 'Chanting Cherubs,' suggested by a portion of one of Raphael's pictures. This was the first original group from the chisel of an American sculptor. To Cooper, also, he was indebted for the commission from Congress to execute his colossal statute of Washington, finished in 1843, after many years' labor, and now in the national capital. During this time he executed, among other original works, the 'Medora,' the 'Angel Abdiel,' and the 'Venus Victrix' (Gallery of the Boston Athenæum). He went to Paris to model the bust of Lafayette. In 1851 he returned to the United States to superintend placing in its destination in Washington his group of the 'Rescue,' in which the triumph of civilization is symbolized. Many vexatious delays prevented the arrival of the work from Italy, and Greenough, unaccustomed by long absence to the turmoil of American life and the variations of the American climate, was attacked by brain fever soon after he had commenced, in Boston, a course of lectures on art. He published a volume of 'Essays' on art topics. Consult Tuckerman, 'Memorial of Horatio Greenough' (New York 1853).

GREENOUGH, James Bradstreet, American Latin scholar: b. Portland, Me., 1833; d. Cambridge, Mass., 11 Oct. 1901. He was graduated from Harvard College in 1856, for some time practised law in Michigan, in 1865 was appointed tutor in Latin at Harvard, in 1874 assistant professor of Latin and in 1883 professor. In 1872 he began at Harvard a course in Sanskrit and comparative philology, and until 1880, when a chair of Sanskrit was founded, gave instruction in those subjects. He became widely known through a series of Latin text-books, particularly a 'Latin Grammar,' prepared in collaboration with J. H. Allen, and wrote also a 'Special Vocabulary to Virgil' verse in both Latin and English, and, with G. L. Kittredge, 'Words and Their Ways in English Speech' (1901). He was one of the founders of the Society for the Collegiate Instruction of Women, which helped to found Radcliffe College. Professor Greenough was the first chairman of the academic board of Radcliffe College. Several papers by him on etymology and Latin syntax appeared in 'Harvard Studies.' For a full account of his life and a complete list of his works consult G. L. Kittredge in 'Harvard Studies' (XIV, Cambridge 1903).

GREENPORT, N. Y., village of Suffolk County, on the eastern end of Long Island, on the Long Island Railroad, 90 miles east of Brooklyn. It has an excellent harbor and shipyards, and the chief industries are fishing and shipbuilding. It is also a popular summer resort. The Eastern Long Island Hospital is situated here and there is a high school. It was first settled in 1831 and was incorporated in 1868. The water plant and lighting works are municipally owned. Pop. 3,089.

GREENS, POT-HERBS. Any plant whose foliage and succulent stems are prepared for the table by boiling. The former term is less applied to the plants themselves than to the dish prepared from them; the latter is often applied to the living plants, but rarely to the culinary preparation. Greens are eminently a spring dish; by proper management they may be obtained long before spring-sown vegetables grow from seed planted out of doors, thus arriving at a time when the appetite is jaded with the usual winter vegetables. Comparatively few (for example, basella and New Zealand spinach) are useful during the hot summer months, but then other vegetables and many fruits take their place. Some (for example, mustard, witloof) are obtainable in the autumn, and a few (kale, endive) even during winter.

In general these plants should all be grown upon rich, moist, well-drained, friable, loamy soil, since upon such they grow quickly, to a large size, and remain succulent and edible longer than upon poorer or drier soils. A soil containing abundant available nitrogenous plant food is particularly desirable. The ground should be thoroughly prepared by deep plowing or digging and the surface made as fine as possible by harrowing or raking. For earliest crops of such hardy plants as spinach and corn salad, the seed may be sown in autumn, and, where the winters are severe, and especially if snowless, protected with a mulch of marsh hay or other material free from weed seeds. They may also be sown as early in the spring as the ground can be worked. Tender plants such as basella, and those that require a high temperature for the germination of their seeds, for instance, purslane, should be sown only after the ground becomes warm. Beyond keeping the surface of the soil loose and free from weeds, the crops need practically no further care. To be best appreciated, greens should be gathered while very succulent and within as few minutes of meal time as are possible to wash and cook them. Since most of them occupy the ground for only a few weeks in earliest spring, they are usually planted by market gardeners between the rows of other slower growing crops or as precursors to the main crop.

Besides the cultivated pot-herbs (in America a rather small list) there are several scores of plants known most widely as weeds. Several of these are superior in some ways to the cultivated kinds. There is no reason why they should not be cultivated; indeed, they deserve cultivation. When to be grown in the garden and when seed cannot be purchased, seed should be selected from those plants that most nearly meet the intending grower's ideal. Probably the best known and most frequently used weeds or wild plants are the following, several of which are more or less cultivated: Lamb's quarters or Goosefoot (*Chenopodium album*), Pigweed (*Amaranthus*, various species), Pokeweed (*Phytolacca americana*), Marsh marigold, «Cowslip Greens» (*Caltha palustris*), Mustard (*Brassica*, various species), Dock (*Rumex*, various species), Quinoa (*Chenopodium quinoa*), Sorrel (*Oxalis*, various species), Purslane (*Portulaca oleracea*), Plantain (*Plantago*, various species), Chicory (*Cichorium intybus*), Cress (*Cardamine, Spilanthes, Barbarea, Senebiera, Gynandropsis, Radicula* — various species in each genus), Peppergrass (*Lepidium*, various species), Mercury or markery (*Chenopodium bonus-henricus*), Nettle (*Urtica*, various species), Winter purslane (*Montia perfoliata*), Rocket salad (*Eruca eruca*), Salad-burnet (*Sanguisorba sanguisorba*).

Of the cultivated pot-herbs the following are probably the best known and the most widely cultivated: Spinach, corn salad, chard, borage, dandelion, collards, mustard, kale, orach, marigold, basella, chicory, endive, nasturtium. Unheaded cabbage and cauliflower, young beets and turnips, whole or only the leaves, and rape are frequently used also.

GREENSAND, in geology, the name given to two series of Cretaceous formation, the Upper and Lower Greensand. The Upper Greensand is a subdivision of the Upper Cretaceous rocks, and is situated immediately below the chalk marl, and just above the Gault. The beds of which it is composed have in them green particles of a mineral called glauconite, mixed with sand, the mixture being known as *greensand*, from which the formations take their name. (See GLAUCONITE). Among the fossils peculiar to it are various ammonites, two pterodontas, two species of fusus, etc. Some are of opinion that the so-called Upper Greensand from which these fossils came is itself Gault. The Lower Greensand is a series of beds constituting the Lower Cretaceous rocks and the lowest member of the Cretaceous group. It is called in Europe Neocomian, a name adopted by Lyell, he considering the term greensand peculiarly inapplicable, as in the district where these strata were first observed sand of a green color was rather the exception. As formation names, the terms are now little used in America.

GREENSBORO, Ala., town, county-seat of Hale County; on a branch of the Southern Railroad, about 72 miles southwest of Birmingham. It was settled in 1816 and is in a cotton-growing section. The chief industries are the cultivation of cotton and corn.. It is the seat of Greensboro Female Academy and of the Southern University. The latter was established by the Methodist Episcopal Church, South, and was opened in 1859. Pop. 2,048.

GREENSBORO, Ga., city, county-seat of Greene County; on the Georgia Railroad, 70 miles west of Augusta. It is the trade centre for a thriving agricultural region, and it has a large creamery, a cotton-mill, cotton-gin and a cottonseed-oil mill. Pop. 2,120.

GREENSBORO, N. C., capital of Guilford County, on the main line of the Southern Railway, 288 miles southwest of Washington, D. C. The city was named in honor of General Greene, commander of the continental army in the battle of Guilford Court House 15 March 1781. The battle-ground is preserved as a park. Educational institutions are the State Normal and Industrial College and Greensboro College for Women, combined enrollment 1,000. There are also three colleges for colored youths: The Agricultural and Technical, maintained by the State; Bennett, maintained by the Freedman's Aid Society, and the Lutheran, supported by the Lutheran Church. Greensboro has 75 factories, employing 6,000 people. The chief industry is the manufacture of cotton goods. Pop. 19,000; including the immediate suburbs, over 30,000.

GREENSBURG, Ind., city and county-seat of Decatur County; on the Cleveland, Cincinnati and Saint Louis Railroad; 64 miles from Cincinnati, 46 miles from Indianapolis and 70 miles from Louisville, Ky. Nearby are large stone-quarries; it is surrounded by a good agricultural region and is supplied with natural gas. The city has a Carnegie Library and the State Odd Fellows Home. Its chief manufactures are flour, furniture and screen wire. Pop. 5,420.

GREENSBURG, Pa., borough, county-seat of Westmoreland County; on the Pennsylvania Railroad; 31 miles east-southeast of Pittsburgh. It is in a coal-mining, coking and natural gas region; and contains a steam-heating apparatus factory, steel works, glass works, nut and bolt works, engine works, brick works and flour mills, and has three National banks. It is the seat of Saint Joseph's Academy. In Hanna's Town, which was near the present Greensburg, was held (1773) the first regularly organized court of justice west of the Alleghany Mountains. Hanna's Town was destroyed by the Indians in 1782. Pop. 13,012.

GREENSHANK, a large species of sandpiper (*Totanus glottis*) breeding in the northern parts of the Old World, and migrating far southward. Several allied species of similar habits occur in America, of which the greater and lesser yellowlegs (q.v.) are familiar to gunners.

GREENSPOND, Newfoundland, a port of entry and sealing station on an island of the same name in the north of Bonavista Bay. Pop. 1,300.

GREENSTONE, formerly a granular rock, consisting of hornblende and imperfectly crystallized feldspar, the feldspar being more abundant than in basalt, and the grains or crystals of the two minerals more distinct from each other. It was called also dolorite. Sir Charles Lyell included under the term greenstone those rocks in which augite was sustituted for hornblende, the “olorite” of some writers, and those in which albite replaced common feldspar. This was sometimes termed andesite. The term is now used the same as diorite, which is an essentially crystalline granular admixture of triclinic feldspar and hornblende. It is not now held to be the equivalent of dolorite. In geology, volcanic rock, occurring in dykes, tabular masses, etc.

GREENVILLE, Ala., city, county-seat of Butler County; on the Louisville and Nashville Railroad; about 77 miles northeast of Mobile. Its chief manufactures are lumber and furniture; it has cotton-gins, an oil mill, a fertilizer factory and a red-cedar factory, and its trade consists principally in cotton and lumber. Pop. 3,377.

GREENVILLE, Ill., city, county-seat of Bond County; on the Vandalia Railroad, about 42 miles east of Alton. It is the seat of Greenville College, under the auspices of the Free Methodist Church, and contains a Carnegie Library. The chief manufactures are flour, lumber, wagons, and carriages, bricks, gloves, lodge emblems, and in addition to its manufactured articles, it has considerable trade in coal, from the coal-fields of the vicinity, and in the agricultural products of the surrounding country. Pop. 3,178.

GREENVILLE, Mich., city in Montcalm County, on the Flat River; the Grand Trunk and the Pere Marquette railroads; about 42 miles northeast of Grand Rapids. Its chief manufactures are lumber, flour, agricultural and lumbering implements, stove fixtures, motor boats, gas engines, refrigerators and furniture. Its trade is in its own manufactured products and in the agricultural products of the surrounding country. The waterworks are municipally owned. Pop. 4,045.

GREENVILLE, Miss., city and county-seat of Washington County; on the Mississippi River, the Southern and the Yazoo and Mississippi Valley railroads; about 139 miles south of Memphis. It contains several large cotton compresses, and cottonseed-oil-, saw-, and planing-mills, a national bank, and has steamboat connection with all important ports on the river, and a large cotton trade. It contains a public library, sanitarium, the King's Daughters Home and several parks and playgrounds. The waterworks and sewage system are owned by the city. Pop. 10,448.

GREENVILLE, Ohio, city and county-seat of Darke County, on Greenville Creek, 95 miles west of Columbus, 95 miles east of Indianapolis; 85 miles north of Cincinnati. Railroads are The Cincinnati Northern; Dayton and Union; Pittsburgh, Cincinnati, Chicago and Saint Louis, and Ohio Electric. It is noted as the site of Anthony Wayne's treaty with the Indians, 3 Aug. 1795. In the early part of the 19th century Tecumseh (q.v.) lived here, in a little Indian village. Greenville is a centre of tobacco-handling industries; has a stove-factory, knitting mills, machine works and one of the largest creameries in the United States. Pop. 8,000.

GREENVILLE, Pa., borough in Mercer County; on the Shenango River, the Erie, the Pennsylvania, and the Bessemer and Lake Erie railroads; about 52 miles southeast of Erie, 12 hours from New York, 10 hours from Chicago. The Shenango furnishes an abundance of good water-power. The chief industrial interests are flour-mills, saw- and planing-mills, foundries, machine-shops, railroad-shops, carriage and wagon works, steel car works, sand plants, machinery for oil-wells and coal-mining. The coal and oil fields and the stone-quarries in the vicinity add to the industries of the town. The trade of the town is considerable, as it is the commercial centre of a large section of Mercer County and places nearby in Ohio. Greenville is the seat of Thiel College, opened in 1870 under the auspices of the Lutheran Church. Pop. 8,978.

GREENVILLE, N. C., town and county-seat of Pitt County, on the Tar River and on the Norfolk Southern and Atlantic Coast railroads. It is the centre of trade for the region in tobacco, cotton and corn. The chief manufactures consist of tobacco, cotton, veneer, oil and buggies. The town operates its own waterworks and electric light plant. Pop. 4,200.

GREENVILLE, S. C., city and county-seat of Greenville County; on the main line of the Southern Railway from Washington to New Orleans; Charleston and Greenville Division, Southern Railway; Atlantic Coast Line Railway; Greenville and Western Railway, and Piedmont and Northern Electric lines. It is an important textile centre, having 20 textile mills in the county. Other industries are foundries, lumber mills, flour mills, cigar factories, etc. It is the seat of Furman University (Baptist), college for men, Greenville Woman's College (Baptist), college for women, and two business colleges. Population within city limits 23,000, including suburban villages 43,000.

GREENVILLE, Tex., city and county-seat of Hunt County; on the Saint Louis Southwestern, the Texas Midland and the Mssouri, Kansas and Texas railroads; about 235 miles north of Houston and 51 miles northeast of Dallas. Greenville was settled in 1844 and incorporated in 1875. It is situated in an agricultural and stock-raising section. The chief industrial interests are connected with cotton and live stock. It has cotton-compresses, cottonseed-oil mills, flour mills, machine-shops, stock-yards and brick-yards. It is the trade centre for a large extent of country and has a large cotton trade. It is the seat of Burleson College, under the auspices of the Baptist Church, of Wesley College (Methodist) and of Holiness University. Greenville was one of the sixteen cities of Texas which, by 1911, had commission government. The electric-light plant, waterworks and sewage systems are owned and operated by the city. Pop. 9,696.

GREENVILLE (Ohio), Treaty of, 7 Aug. 1795. A treaty between the United States and all the Northwestern Indian tribes; the former represented by Anthony Wayne, who had defeated the Indians in the campaign of 1794, especially at the battle of the Fallen Timbers (q.v.). A full delegation was present from every hostile tribe, the whole numbering 1,130. They surrendered to the whites all southern Ohio and southeastern Indiana, with lands around Fort Wayne, Fort Defiance, Detroit, Michillimackinac, and the French towns, and 150,000 acres near the Falls of the Ohio (Louisville) which had been allotted to George Rogers Clark and his soldiers. The United States acknowledged the Indian title to the remaining territory, and agreed to pay annuities of $9,500 in all to the tribes. All prisoners on both sides were restored. This peace secured quiet to the borders for 15 years. But the guaranty of the lands to the Indians enabled the British to use the latter to desolate the borders in the War of 1812; and after the war (see TREATY OF GHENT) Great Britain attempted to make this treaty boundary a permanent one, forbidding United States settlement beyond it. See GREENVILLE, OHIO.

GREENWALD, Emanuel, American theologian: b. near Frederick, Md., 1811; d. Lancaster, Pa., 1885. He was educated privately; and after being licensed by the Lutheran Synod of Maryland in 1831, received a call to New Philadelphia, Ohio. Here for 20 years he worked to organize the Lutherans of the Middle West. Later he became pastor at Columbus, Ohio, Easton, Pa. and Lancaster, Pa. He served for many years as editor of the *Lutheran Review* of which he was also founder; was president of the oldest Lutheran Synod in the United States, the Pennsylvania Ministerium, from 1873–77, and of the Lutheran Diet 1878. He wrote 'The Lutheran Reformation' (1867); 'The Foreign Mission Work of Louis Harms' (1868); 'Sprinkling, the True Mode of Baptism' (1876); 'The True Church: Its Way of Justification and its Holy Communion' (1876); 'Romanism and the Reformation' (1880), besides several children's books.

GREENWAY, Thomas, Canadian statesman: b. England, 1838; d. 30 Oct. 1908. In 1844 he went with his father to Ontario. He took up land in Manitoba, and in 1887 became the Liberal leader of the opposition and Prime Minister in the provincial government 1888–90. He secured the abrogation of the obnoxious «monopoly» clause in the charter of the Canadian Pacific Railway; and during his term passed measures abolishing the use of French as an official language and the separate school system of the province.

GREENWEED. See DYEWEED.

GREENWICH, Conn., town in Fairfield County, on Long Island Sound, the New York, New Haven and Hartford Railroad, about 28 miles northeast of New York. The town was founded in 1640, as a part of the province of New York, and remained within the jurisdiction of the Dutch colony from 1642 to 1650, when, by agreement between the English and Dutch, it became a part of Connecticut. In order to preserve the charm of its country life, it has retained the old form of town meeting government, with three selectmen as agents, as it was over 250 years ago, except in the central part of the town, where a borough government, a warden and six burgesses, have charges of affairs. There are six residential centres within its area of 80 square miles; namely, Byram Shore, Belle Haven, Greenwich village, Riverside, Sound Beach and Round Hill. It is the seat of Greenwich Academy, Brunswick School and Rosemary Hall. Pop. 18,000. Consult Mead, 'History of the Town of Greenwich.'

GREENWICH, grĕn'ij, **England,** metropolitan and parliamentary borough of London, in Kent, on the south bank of the Thames, five miles from Saint Paul's cathedral, area, 3,852 acres. It is celebrated for its national institutions, among which are Greenwich Royal Observatory (q.v.), and Greenwich Hospital (q.v.) the latter occupying the site of a royal palace. Among educational institutions, the Royal Hospital School for boys who may enter the navy, and the Blue-Coat School, are liberally endowed. Shipbuilding and engineering are among the staple industries. Blackwell Tunnel and Greenwich Tunnel give passenger communication with the north bank of the river. Greenwich was the location of the celebrated Whitebait Dinner, held annually by the ministry of the day, but abolished in 1894 and the Ship Tavern, in which it was held, was closed in 1908. General James Wolfe, the hero of Quebec, was buried in the family vault in the parish church of Saint Alfrege. The borough returns one member to the House of Commons. Pop. 95,968. Consult Howarth, 'Greenwich' (1886).

GREENWICH HOSPITAL, formerly a home for disabled sailors, now a royal naval college, situated at Greenwich, England. The present buildings are on the site of an ancient royal palace, in which were born Henry VIII, Queen Mary and Queen Elizabeth. The palace was razed by Charles II, and during his reign part of the present structure was erected. Under William and Mary it was converted into a hospital for seamen. It was formally opened in 1705. Many other buildings were added in the century following. Its endowments were increased through bequests and also by forfeited estates. About 2,500 old and disabled seamen were boarded there, while over 5,000 outpensioners, as they were called, received aid from its funds. In 1865 a pension act was passed under the terms of which such seamen as were willing to quit the institution received liberal pensions. In 1869 their leaving was made compulsory, all funds being then converted into pensions and the buildings were prepared to accommodate students of the Royal Naval College. A school for the sons of seamen is still maintained from the funds, the income from which at present exceeds $1,000,000. Consult Fraser, 'Greenwich Royal Hospital' (London 1910).

GREENWICH OBSERVATORY, the most important public observatory in England, located at Greenwich (q.v.) on the prime meridian in lat. + 51° 28′ 38.4″ N. It was established by King Charles II in 1675, for the purpose of promoting navigation and astronomy. The direction of the observatory is under the charge of the Astronomer-Royal, who is assisted by eight astronomers and a staff of computers. The chief instruments employed are a meridian circle, having a circle six feet in diameter and an eight-inch telescope; and an eight-inch altazimuth, both by Sims; Lassell's two foot reflector; and Grubb's 28-inch refractor, 13-inch, 26-inch and 9-inch photographic refractors; the last two having been presented by Sir H. Thompson. The standard motor clock is also located here, which, by electrical connection, controls a system of clocks throughout the United Kingdom. The department of magnetics and meteorology was established in 1838, since when valuable observations have been made in this field.

Since 1750, all observations made have been strictly recorded, the annual publications beginning in 1836. Separate volumes are devoted to Star Catalogues and the Reductions of Lunar and Planet Observations. The principal efforts of the observatory have been devoted to determining the positions of the stars, planets and sun, the accurate following of the course of the moon and the daily recording of sun spots.

The first Astronomer-Royal was John Flamsteed (1675–1719). He was followed by Edmund Halley (1720–42). Under James Bradley (1742–62) the science of modern stellar astronomy was established. George Airy (1835–81) brought the work of the observatory to its present state of efficiency.

GREENWOOD, Frederick, British journalist: b. London, 1830; d. 1909. After several early novels, the best of which was 'Margaret Denzil's History,' he became editor of the *Queen* (1861–63) and of the *Cornhill Magazine* (1864–68). With George Smith he established the *Pall Mall Gazette* in 1865, and was its editor until 1880, during which time the paper was a powerful Conservative organ. Later he was editor of *Saint James's Gazette,* and the *Anti-Jacobin* (1891–92). His other publications, in addition to numerous magazine and newspaper articles include 'Louis Napoleon Bonaparte' (1853); 'The Lover's Lexicon' (1893), and 'Imagination in Dreams and their Study' (1894).

GREENWOOD, Grace. See LIPPINCOTT, SARAH JANE (CLARKE).

GREENWOOD, Miss., city and county-seat of Leflore County, on the Yazoo River and on the Southern and Yazoo and Mississippi Valley railroads, about 90 miles north of Jackson. There are oil mills, planing mills, cotton compresses, wagon, furniture and ice factories, and bottling works. It carries on an extensive trade and is important as a shipping centre. The principal buildings are the Carnegie Library, courthouse, schools and the Elk's Home. The city owns and operates its waterworks and electric-light plant. Since 1915, the commission form of government has been in effect. Pop. 5,836.

GREENWOOD, S. C., city and county-seat of Greenwood County, on the Seaboard Air, the Piedmont and Northern, the Southern and the Charleston and West Carolina railroads. The Lander Female College, the Bailey Military Institute, the Brewer Normal School for negroes and the Connie Maxwell Orphanage are located here. The chief manufactures are cottonseed oil, cotton, spools, bobbins, lumber and overalls. The waterworks, electricity plant and sewage system are owned by the municipality. Pop. about 6,700.

GREENWOOD CEMETERY, N. Y., the principal burial place of New York and neighborhood, in South Brooklyn, near Gowanus Bay; area 475 acres. It occupies a picturesque site, and is laid out so handsomely as to make it almost without a rival in the world. From its heights the waters of New York Bay may be seen on the one hand, and the broad expanse of the Atlantic on the other. There are 20 miles of roadway and more than 25 miles of footpaths. Many distinguished men and women are buried here. The main gateway is adorned with four magnificent sculptures in *alto relievo*, representing four scenes in the resurrection. The number of interments exceed 350,000.

GREENWOOD LAKE, a body of water in Orange County, N. Y. and Passaic County, N. J., 50 miles northwest of Jersey City. Its length is about six miles and its width a little more than half a mile. The village of Greenwood is situated at the northern end.

GREER, David Hummell, American clergyman: b. Wheeling, W. Va., 20 March 1844. He was graduated from Washington College, Washington, Pa., in 1862, and studied theology in the Episcopal Seminary at Gambier, Ohio. From Brown University and Kenyon College he received the titles of Doctor of Divinity and Doctor of Laws. His first ministry was at Covington, Ky.; from there he was transferred to Clarksburg, W. Va., and in 1871 he was called to Grace Church, Providence, R. I. In 1885, Dr. Greer became rector of Saint Bartholomew's Parish, the most fashionable and richest of New York Episcopal parishes. In 1890 he established the Saint Bartholomew's Parish House, at 42d street and Third avenue, at a cost of $400,000, built largely through the liberality of Cornelius Vanderbilt. This parish house embraces a wide field of charitable, missionary and educational work. In 1903 Dr. Greer was elected coadjutor to Bishop Potter of the New York Episcopal diocese. He had previously declined three bishoprics, that of coadjutor-bishop of Rhode Island, bishop of Pennsylvania and bishop of Massachusetts to succeed Phillips Brooks. Upon Bishop Potter's death in 1908 Dr. Greer became bishop. He has published 'The Historic Christ' (1890); 'From Things to God' (1893); 'The Preacher and His Place' (1895); 'Visions' (1898).

GREER, James Augustin, American rear-admiral: b. Cincinnati, Ohio, 28 Feb. 1833; d. Washington, D. C., 17 June 1904. Entering the navy in 1848, he was promoted lieutenant in 1855, and was on board the *San Jacinto* when that vessel intercepted the English steamer *Trent*, on which were Mason and Slidell, the Confederate Commissioners. He commanded the ironclad *Benton* in the fleet that passed the Vicksburg batteries; and in 1873 was in command of the *Tigress* in its search of the polar sea for the *Polaris*. He became rear-admiral in 1892 and was retired in 1895.

GREET, Ben, English manager-actor. He was educated at the Royal Naval School, New Cross. His principal achievement has been the production of Shakespeare's plays out of doors using stage properties similar to those of the original presentations. He has also played in 'Everyman,' a 15th century morality play, with which he toured the United States in 1902. Since then he has been widely known as the principal of the Ben Greet Touring Companies and of a training school for the stage. Some of his leading rôles are Malvolio, Dogberry, Sir Peter Teazle, Benedick, Triplet, Tony Lumpkin, Friar Laurence, Hamlet, Touchstone and Dromio.

GREGARINE, a parasitic sporozoan (see SPOROZOA) dwelling in the intestines of many insects, crawfishes and other arthropods.

GREGG, David, American Presbyterian clergyman: b. Pittsburg, Pa., 25 March 1845. He was graduated at Washington and Jefferson College in 1865. He has been pastor in several places, and since 1889 has preached in Lafayette Avenue Presbyterian Church, Brooklyn, N. Y. Since 1909 he has been president emeritus and lecturer extraordinary of the same church. He is editor of *Our Banner* and among his many published volumes may be mentioned: 'Makers of the American Republic' (1896); 'Ideal Young Men and Women' (1897); 'Facts that Call for Faith' (1898); 'Things of Northfield and Other Things' (1899); 'New Epistles from Old Lands' (1900); 'The Dictum of Reason on Man's Immortality' (1902); 'Between the Testaments' (1907); 'The Master as a Preacher,' translated into Greek (1909); 'Pulpiteers of the Nineteenth Century.'

GREGG, David McMurtie, American soldier: b. Huntington, Pa., 10 April 1833. He was graduated from the United States Military Academy in 1855; and after serving in various Indian campaigns, was appointed colonel of the Eighth Pennsylvania cavalry volunteers. At the beginning of the Civil War, he was appointed brigadier-general of volunteers and commanded several cavalry divisions. In 1864 his services in the great battles of the first year of the war won him the brevet of major-general of volunteers. Later he succeeded to the command of all of the cavalry of the Potomac; resigning in 1865. In 1874 he served as United States consul at Prague, Bohemia; and became auditor-general of Pennsylvania in 1891. He is the author of 'Second Cavalry Division of the Army of the Potomac in the Gettysburg Campaign' (1907).

GREGG, John Irvin, American soldier: b. Bellefonte, Pa., 1826; d. 1892. In the Mexican War, he attained the rank of captain in 1847. He served in the Civil War as captain of the Third Cavalry and of the Sixth and was appointed colonel of the 16th Pennsylvania cavalry in 1862. In the battles of Gettysburg and Cold Harbor he was placed in command of a brigade of cavalry of the Army of the Potomac. He was awarded successively the titles of major-general of volunteers, brigadier-general in the regular army, colonel of the Eighth cavalry and retired in 1879.

GREGG, Josiah, American traveler, trader and writer: b. Overton County, Tenn., 19 July 1806; d. Clear Lake, Cal., 25 Feb. 1850. His father was of Scotch-Irish extraction and his mother was of Pennsylvania German stock. His parents migrated to Illinois in 1809 and to Missouri three years later, settling in the Boone's Lick country. Of the education of Josiah Gregg, but little is known, though his writings bear evidence of a knowledge of the classics and an acquaintance with mathematics and astronomy. He was believed to have studied medicine but probably never practised that profession. At the age of 25 he became interested in the overland trade between the frontier of Missouri and the Mexican provinces. As the result of his experiences and observations during the course of his journeys across the Great Plains, he wrote a book which was published in two volumes, in 1845, entitled 'Commerce of the Prairies, or the Journal of a Santa Fe Trader, During Eight Expeditions across the Great Western Prairies and a Residence of Nearly Nine Years in Northern

Mexico.' This work has ever since been recognized and accepted as the most authoritative treatise concerning the overland trade between the Missouri River and the Rio Grande during the two decades preceding the Mexican War, including accurate descriptions of the geography, topography, climate and resources of the different parts of the country through which he traveled, accounts of the Indian tribes and their manners, customs and habits of living. During the war with Mexico, he accompanied the expedition of Col. A. W. Doniphan as a newspaper correspondent. In 1849, he went to California, where he was employed in the service of the government. He was reported to have left the manuscript of an unpublished volume, entitled 'Rovings Abroad,' but if so it disappeared soon after his death and so was lost to the world. Gregg's 'Commerce of the Prairies' was reprinted in Reuben Gold Thwaites, 'Early Western Travels.' Consult Connelley, William E., 'Doniphan's Expedition and the Conquest of New Mexico and California,' especially the supplemental notes.

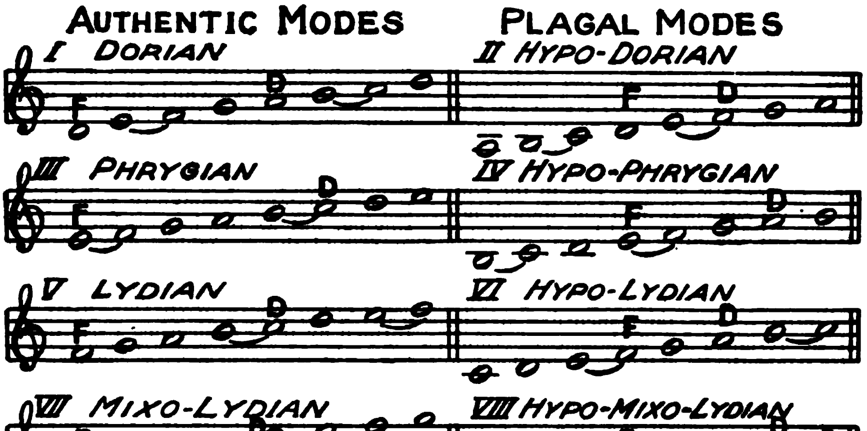
GREGG, William, Canadian Presbyterian clergyman and educator: b. Donegal, Ireland, 1817; d. Toronto, 1902. He studied at the universities of Glasgow and Edinburgh and in 1846 emigrated to Canada as a missionary. In 1847 he became a minister of the Free Presbyterian Church and held several pastorates in Ontario. In 1864 he became a lecturer at Knox College, Toronto, where he succeeded to the professorship of apologetics, holding that office from 1892 to 1895 when he retired. He wrote 'Book of Prayer for Family Worship' and 'A History of the Presbyterian Church in the Dominion of Canada' (1885).

GRÉGOIRE, grā-gwâr, **Henri,** COUNT, French churchman and statesman: b. 4 Dec. 1750; d. Paris, 28 May 1831. In 1789, while cure of Emberménil, in the district of Nancy, he was sent by the clergy of Lorraine as their representative to the states-general. As one of the secretaries of the constituent assembly he joined the extreme democratic section, and in the convention voted for the condemnation, though not for the death, of the king. Although extreme in his democratic opinions, he was an unflinching Jansenist. He was a member of the council of Five Hundred, of the corps législatif, and of the senate (1801). On the conclusion of the concordat he resigned his bishopric of Blois. He voted against the establishment of the Imperial government, and alone in the senate resisted the restoration of titles of nobility. He himself afterward accepted the title of count, but in the senate always opposed Napoleon, and in 1814 was one of the first to vote for his deposition. He left numerous works, among them 'Ruines de Port Royal' (1801); 'Essai Historique sur les Libertés de l'Eglise Gallicane'; 'Historie des Sectes Religieuses depuis le Commencement de ce Siècle'; 'Annales de la Religion' (1795–1803).

GREGORAS, Nicephorus, a priest of Constantinople: b. 1295; d. 1359. He was responsible for a proposed reformation of the calendar which closely approximated the Gregorian. His name appears in various theological controversies. His history of the Byzantine Empire from 1204 to 1359 is published in Migne, 'Patrologia Græca' (Vols. CXLVIII and CXLIX, Paris 1854–66).

GREGORIAN CHANT (Latin, *cantus gregorianus, cantus planus, cantus firmus*; Italian *canto fermo;* French, *chant gregorien, plain-chant;* German, *gregorianischer Choral*) is as old as the Church itself. As an integral part of the liturgy, music has its origin in the celebration of the Last Supper. According to the evangelists, Matthew and Mark, after the consecration and breaking of bread, our Lord and the apostles *sang* a hymn, which is commonly accepted to have been the "Great Hallel" of the Jewish passover celebration, that is, the Psalms, cxii–cxvii (Douai version), inclusive. The first Christian communities of Jerusalem in Palestine and Antioch in Syria were founded by newly converted Jews. Consequently it is more than probable that, although the converts from paganism were soon in the majority, melodies in use in the temple and in the synagogues continued to be sung at their religious meetings. This hypothesis is all the more reasonable because the recruits from paganism could offer nothing either in the way of poetry or music which would have been acceptable to the new cult. As to how the chant came to Rome and concerning its early development, archæology has so far been unable to ascertain any definite information. Conjecture and probability are the most we have to go by. Without doubt Greek music, which was known to the Romans, as was every other form of Hellenic culture, had its influence on the formation of the Christian worship music. It is certain also that there was a constant development and that singing played an ever greater rôle in the early liturgy. There were hardly any religious functions of which the singing of psalms, responsories and hymns did not form a part. From the fruitful soil of the early Church sprang with great exuberance a new hymnology, which in turn, as its logical complement, was translated into melodies. Many of the latter were spontaneous improvisations, the children of ardent hearts and imaginations illumined by the new light. At first the whole religious community participated in the singing, but as the liturgy became more elaborate and the assemblies more numerous, this participation on the part of all the faithful had to be restricted to certain portions of the service. Other more particular parts were performed by the Primicerius, Præcentor or Monitor, who also had general charge of the singing and whose office it was to see that the faithful were well prepared for their allotted task. After emerging from the catacombs at the beginning of the 4th century the Church displayed its ever-growing vitality in the unfolding of her liturgy and the increasing splendor of her cult. At this period the chants used must have been numerous and varied. Popes and bishops fostered the liturgical music in every manner. Pope Sylvester (314) and Hilarius (461) founded schools for its cultivation. Saint Ambrose, Archbishop of Milan (397), took a step which was of greater importance than anything which had been done up to that time. He gave system and order to the melodies and chants in use in his archdiocese by giving them a theoretic basis. This he accomplished by adopting four modes or scales, each one of which had as its initial one of the four notes of the Tetrachord (sequence of four notes), D, E, F, G. The four modes adopted by Saint Ambrose were consequently: (a) (Dorian) D, E,F, G, a, b,c, d; (*b*) (Phrygian) E,F, G, a, b,c, d, e; (*c*) (Lydian) F, G, a, b,c, d, e,f, (*d*) Mixo-Lydian), G, a, b,c, d, e,f, g. All the melodies and chants used had some one of these modes for their foundation. Saint Ambrose originated the custom of singing hymns and psalms antiphonally.

When 200 years later, Gregory the Great, the man who gave the music of the Church its permanent character and from whom it is named, ascended the papal throne, the number of feasts and consequently of liturgical chants had increased to such an extent that the four modes fixed by Ambrose were no longer sufficient. Many of the new melodies did not belong to any one of the scales enumerated above. They had grown beyond the original frame. As Gregory partly reformed and, at least in outline, gave shape to the ecclesiastical year as we now know it, he was compelled also to rearrange existing chants, reject inferior ones, adapt old ones to new texts and add new ones of his own creation. In order to carry out this vast plan be found it necessary to enlarge the tonal system then in use. He retained the four Ambrosian modes, which were henceforth designated as the *authentic* modes, and added thereto four more which he called *plagal*. Gregory formed the new modes by transposing the last four notes of the existing — authentic — scales an octave lower, so that each plagel mode began a fourth below the *authentic* from which it sprang. Thus the tonal system as completed by Saint Gregory was as follows:



[N. B.— The letters F and D in the above diagram stand respectively for *final* and *dominant*. The *final* is the tone on which a melody finds repose, or a satisfactory ending. As will be observed, the *final* for any given authentic mode and its derived plagal are identical. The *dominant* is that tone which occurs oftenest or predominates in any melody.]

Four more modes were added to these in later centuries, but they are not different in essence from the eight named above. By means of various signs — dots, strokes, bars or hooks, collectively called neums — all of which had a conventional meaning, and which were placed over and alongside the words of the texts, Saint Gregory indicated the melodies to which these texts were to be sung. The book containing the chants for the numerous offices was called "antiphonarium cantorum." It was deposited near the altar of Saint Peter so as to convey that the pontiff wished it to be considered as the norm for the whole Christian world.

In order to gain an insight into and an appreciation of the nature and character of the Gregorian melodies, it will be well to examine a little more closely the tonal material out of which they are constructed. We will notice that all the scales are diatonic, that is to say that each one has five whole tones or steps and two half-steps or semi-tones; furthermore that the half-steps or semi-tones occur in a different place in each scale, according to what the initial note happens to be, and, finally that only one of them has a *leading tone* or half-step between the seventh step and the octave or repetition of the initial note. It is these three features which differentiate the Gregorian modes so markedly from our modern scales and which give them that impersonal and objective character so marvelously suited to the purpose they serve, namely, that of expressing the ideas and sentiments conveyed by the sacred texts. In other words, these modes, or tonalities, lend themselves to the expression of a mental attitude of objectivity as against the modern scales which, on account of their chromatic character, are more pliable vehicles for conveying the emotions springing from subjectivism and introspection. If we remember, in addition to the general character of the Gregorian, or Church modes — as they are often called — the rule which permits the use of six intervals only in the formation of Gregorian melodies, namely: the major and minor second, the major and minor third, the perfect fourth and the perfect fifth, we realize that this tonal system is better adapted for the expression of reverence, humiliy, peace and joy, whereas the modern chromatic system is more suited for the expression of passion and dramatic conflict.

Saint Gregory used every means at his command to propagate the chant and have it universally adopted. He established schools for its proper interpretation. At one of these he is said to have taught in person. Missionaries who were sent from Rome into foreign lands took with them a copy of the antiphonarium, and, of course, a knowledge of how the melodies it contained should be sung. Thus, Saint Augustine brought the melodies to England at the command of Saint Gregory himself. The great pope's successors continued the process of propaganda during the following centuries. In the 8th century Saint Boniface introduced the chant in Germany, and by him several «scholæ cantorum» were established on German soil. Through Pepin and after him through Charlemagne, it found its way into Gaul and into the whole territory under the emperor's sway.

It is held by many historians that the original chant was, in the main, syllabic, that is to say, that only one note was sung to each syllable and that only the word «alleluja» was ever extended over several notes. Be that as it may, it is certain that it gradually developed into a melismatic system, syllables being often extended over smaller and greater groups of notes.

From the time of Saint Gregory until the advent of Guido d'Arezzo (995–1050?) the primitive means of determining the melody, the neums described above, remained in use. As has been pointed out, these signs were intended to assist the memory of the singers in reproducing the melodies which they had learned by oral transmission. It is not to be wondered at that, in the course of time, many of the melodies were altered and modified in the many places where they were in use. There were frequent variations and modifications due to local habits, different temperaments, but above all, to the insufficiency of the means employed to indicate with precision the form of the melodies. Careless copyists and finally the arbitrariness and caprice of singers in the various countries led to confusion. Before the time of Guido d'Arezzo, attempts had been made to fix with more precision the intervals of the melodies. He found in use two lines, a red and a yellow one, drawn across the page. Upon the red line was placed the F, and C was put upon the yellow one. Above, below and between these two lines the neums were written. By placing a black line between the two already existing and adding another above or below these three as the *ambitus* or range of the melody might require, Guido created the four line staff which has been used ever since for the chant, and made it possible to indicate precisely the form of a melody for all time to come. Guido and his pupils transcribed the existing chants into the new system of notation. Copies of these transcriptions found their way into the cathedrals and monasteries of many countries where they took the place of the books formerly in use. Though the neums as a *system of notation* were superseded by the more precise invention of Guido, they continued nevertheless to be employed to indicate the manner of *interpretation*. Although Guido's invention was epoch-making and of incalculable importance in the history of music, it must not be inferred that it was at once universally adopted. Neums as a means of notation continued in use in many places and institutions far into the 13th century. Nor must we imagine that because of the introduction of the new system of notation no further modifications of the chant took place. As new saints were canonized and new feasts instituted by the Church, offices and chants were necessarily created. Then the growing skill of professional singers gave rise, especially in the Alleluja following the gradual, to improvisations, elaborations and displays of virtuosity which often exceeded the limits of good taste and appropriateness.

As the melodies comprising ecclesiastical music grew out of the sacred texts and were never performed without being wedded to these texts, it is but natural to assume that the melodic construction partook of the rhythmical form of the texts. Especially must this have been the case when the chant was still largely syllabic. Some maintain that the ancient chant had a definite — artificial — rhythm, as in our modern music, in contradistinction to the natural, or that dictated by the rhythm of the text. Whatever the prevailing rhythm was at the beginning of the 10th century, it was now to undergo a gradual change. The monk Hucbald invented the *organum* or diaphony, that is, the practice of having a second voice sing the melody a fifth above or a fourth below the original, or add to the fifth also the octave, the first voice meantime maintaining the original melody. By this step Hucbald paved the way for the polyphony which was soon to develop and find its culmination in the wonderful creations of Palestrina and his school in the 16th century. Sulzer in his ‹Allgemeine Theorie der Künste,› in the article on harmony, points out that polyphony was latent in the unison singing of the Gregorian melodies by old and young, men and boys, each class of voice, soprano, alto, tenor, baritone and bass, having a different pitch.

Hucbald's system of parallel motion of fifths and octaves was soon succeeded by attempts at contrary motion, and counterpart as we know it, that is, point against point (or note against note) was born. To the Gregorian melody which now became «cantus firmus,» that is, unchangeable melody, were added one or more others. In giving birth to the new system and continuing to be its foundation and the source whence polyphony drew its life and being, the Gregorian chant lost its most distinguishing characteristic, that is, its natural rhythm. The themes taken from the chant and used by contrapuntists as «canti fermi» were forced into the rhythmical straight-jacket. Each note of the cantus firmus had now to assume a definite value in order that the added melodies simultaneously sung might harmonize with it. Polyphony, or the new school of music, increased in favor very rapidly to the detriment of the old chant. Instrumental music, which was gradually developing, also had a deteriorating influence on the execution and cultivation of the ancient music of the Church. Counterpoint in many instances lost its original purpose and degenerated into artificiality. Composers used it to display their skill rather than to give expression to the ideas and emotions latent in and suggested by the text to which it was wedded. A reform movement toward primitive simplicity set in toward the end of the 15th and the beginning of the 16th century. The Council of Trent enacted laws concerning the abuses that had crept into the chant as well as against the extravagances which the display of skill for its own sake had brought about and which in fact almost caused the total exclusion of figured music from the Church. In a brief dated 25 Oct. 1577, Pope Gregory XIII directs Giovanni Perluigi Palestrina and Annibale Zoilo (Palestrina was at the time director of the papal choir and Zoilo a member of the same) to revise the chants contained in the «Antiphonaria,» «Gradualia,» and «Psalteria,» and «eliminate» therefrom «all barbarisms, obscure passages, contradictions and superfluous additions which, through the ignorance, neglect, and also through the malice of composers, copyists and singers, have crept into these books.» A pupil of Palestrina, Giovanni Guidetti, had, a few years previously, edited the various chants for the celebrant contained in the Missal, which had been newly revised by a commission of cardinals appointed for this purpose after the Tridentine Council. Palestrina, Zoilo and Guidetti in their labors of revision acted upon the principle which had been lost sight of for a time, but which was now generally accepted by musicians in Rome, «that the words of the texts should be sung to the notes as they ought to be spoken or declaimed without notes.» This principle in its application brought into universal use the three different kinds of note-values: the longa, the brevis and the semibrevis. The work of revision, of the Graduale only, which was continued and completed after Palestrina's death (2 Feb. 1594) by Felice Amerio and Francesco Suriano involved many excisions and abbreviations; reduced many chants which had been elaborately melismatic to a syllabic form. This revised edition derived its name «editio medicea,» from the fact that it was printed by the «stamperia» or press of that name established in Rome by Cardinal Ferdinand de Medici. The Congregation of Sacred Rites, in 1595, appointed Giovanni Maria Nanino, Giovanni Andrea Dragoni, Luca Marenzio and Fulgentio Valesio to edit, in accordance with the principles stated above, the 'Pontificale Romanum.' The revised books were now printed and published with the approbation of Pope Paul V (1605–21) and that of the prefect of the Congregation of Sacred Rites. This approbation did not carry with it the prohibition of the use of the old, more elaborate, now called traditional, versions of the chant. No doubt because of the latitude thus permitted, the abbreviated version did not make much headway outside of the papal territory. Besides this, monody (solo singing) and the theatrical style in general came into vogue in Italy at the beginning of the 17th century. It took such a hold of public taste that even the works of Palestrina and the masters of his school were temporarily forgotten for the trashy and trivial products which now had the upper hand. This being the case with regard to the polyphonic style, it was natural that the austere, chaste and simple Gregorian melodies should suffer even greater neglect. While in Italy and in some other parts of the world the chant was for a time neglected, there were countries, such as France, Belgium, Spain and the Catholic parts of Holland where it never ceased to be cultivated according either to the traditional or the abbreviated version. Many different editions came into use, notably in France, where many dioceses had their own versions. Toward the middle of the 19th century the plan entertained by Gregory XIII, Clement VIII and Paul V, of having uniformity for the whole Catholic world in everything pertaining to the liturgy, including the chant, was revived with new vigor. Pope Pius IX, in 1868, appointed a commission to whom he entrusted the task of editing, in accordance with existing requirements, the «editio medicea,» which Pius IX and his successor, Leo XIII, repeatedly declared to be the official version of the Gregorian chant for the whole Church, and archæologists — notably the Benedictines of Solesmes, A. Dechevrens, S. J., of Paris, the Belgian savant, G. A. Gevaerts, Dr. Peter Wagner of Freiburg, Switzerland, and others — made exhaustive studies of the manuscripts dating from the 9th century (the oldest so far discovered) up to the Renaissance. The results of these studies induced Pius X, to appoint (1904) a commission for the purpose of preparing the «editio vaticana,» embodying the fruits of the researches and labors of learned men for many years past. Whatever may be the differences between this latest version and the many that have gone before, they in no sense change the essential character of the chant. This character has its root primarily in the nature of the scales or modes used, as has been shown above, and, secondly, in the intervals in the construction of the melodies. As has been pointed out, the melodies sprang from the sacred texts of the liturgy: they were their complement and splendor. The Church has always declared the chant to be her own music par excellence. Other forms of music which she admits in her cult, the Palestrina, or polyphonic, and the modern styles, are to be judged as to their fitness in the light of the Gregorian chant, which is the norm and standard of excellence because it best expresses the attitude of prayer.

Bibliography.— Some of the works on the Gregorian chant which may be profitably consulted are Haberl, 'Magister Choralis'; Kienle, 'Choral-Schule'; Gietmann, 'Kunstlehre' (Vol. III); Kornmüller, 'Lexikon der Kirchlichen Tonkunst'; Gevaert, 'La Melopée Antique dans le Chant, de l'Église Latine'; the Benedictines of Solesmes, 'Paléographie Musicale'; Dechevrens, 'Études de Science Musicale.'

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GREGORIAN LITURGY, the ritual which Pope Gregory I introduced after 590 in the Roman Catholic Church in the administration of the Eucharist, as exhibited in the book entitled 'Gregorianum Sacramentarium.' St. Gregory made a new arrangement of the liturgy of Gelasius, which was previously in use, expunging from it what seemed to him useless and adding a very few new prayers. The celebration of the mass is still essentially the same as it was then.

GREGORIAN MASS. Pope Gregory I (590–604) wrought many reforms in the Liturgy of the Church. There is still much controversy, however, as to the extent of his reforms of the Mass. It is agreed that to the Canon he added «diesque nostros in tua pace disponas, atque ab æterna damnatione nos eripi, et in electorum tuorum jubeas grege numerari.» He also caused the Pater Noster to be recited in the Canon before the breaking of the Host, deeming it unsuitable that the Canon, the work of an unknown scholar, should be said over the oblation instead of the prayer which the Redeemer himself composed. The Alleluia also might now be chanted after the Gradual outside of Paschal time; the chasuble was forbidden to subdeacons; and deacons might not sing any portion of the Mass other than the Gospel. There have been a few minor changes since Gregory's time but the Mass is to-day practically as Gregory left it at the beginning of the 7th century. See GREGORIAN CHANT; MASS.

GREGORIANUS, Roman jurist of the 3d century who compiled the Codex Gregorianus on which the later Codex Justianus was supposedly based. Consult Sohm, 'Institutes of Roman Law' (trans. by Ledlie, 2d ed., Oxford 1901).

GREGOROVIUS, grĕg-o-rō'vĭ-us, **Ferdinand,** German historian and poet: b. Neidenburg, East Prussia, 1821; d. Munich, 1891. He received his education at Königsberg and then spent several years in Italy, where he wrote 'Wanderjahre in Italien' (1857–77). Further travels carried him into Greece, Turkey, Egypt and Syria. He divided his last years between Rome and Munich. His historical and descriptive works are very numerous. Among the latter are 'Corsica' (3d ed., 1878, trans. into English); 'Figuren; Geschichte, Leben und Scenerie aus Italien' (1856); 'Siciliana' (1860); 'Lateinische Sommer' (1863); 'Die Insel Capri' (1868, 3d ed., 1897); 'Von Ravenna bis Mentana' (1871); 'Apulische Landschaften' (1877). Predominant among his historical studies are those of Roman history, chiefly: 'Geschichte des römischen Kaisers Hadrian'; several works on mediæval Italy; 'Die Grabdenkmäler der Päpste' (2d ed., 1881); 'Die Geschichte der Stadt Rom in Mittelalter' (8 vols. 1859–72, English trans. by Hamilton, 1894–1900; Italian trans., 1874–76); 'Lucrezia Borgia' (3d ed., 1875); 'Urban VIII im Widerspruch zu Spanien und dem Kaiser' (1879); 'Una Pianta di Roma delineata da Leonardo da Besozzo Milanese' (1883). On the culture of Greece he wrote 'Kleine Schriften zur Geschichte und Kultur' (1887–92); 'Athenais, Geschichte einer byzantinischen Kaiserin' (1882); 'Geschichte der Stadt Athen im Mittelalter' (2d ed., 1889). Besides these he published several poetical, dramatic and critical works including 'Werdomar und Wladislaw' (1845); 'Goethe's Wilhelm Meister in seinen sozialistischen Elementen' (1849); 'Die Polen und Magyarenlieder' (1849); 'Der Tod des Tiberius' (1851), a tragedy; 'Euphorion' (6th ed., 1891), an epic of Pompeii; 'Gedichte' (1892). He edited 'Briefe Alexanders von Humboldt an seinen Bruder Wilhelm' (1880). His letters to Hermann von Thile were edited in 1894. Consult Münz, 'Ferd. Gregorovius und seine Briefe an Gräfin Lovatelli' (Berlin 1896).

GREGORY, Saint, of Armenia, surnamed THE ILLUMINATOR (GREGOR LUSAVORITCH), the apostle and patron saint of Armenia: b. Valarshabad, Armenia, about 257; d. in the wilderness of Upper Armenia, 332 or shortly thereafter. Modern Armenians venerate as a literary heritage of the Illuminator a collection of discourses and epistles belonging probably to a time subsequent to 450. The chief source for the life of Gregory and one of the most famous works of Armenian literature is the work of Agathangelos, honored among the Armenians as the first historian of their nation. The author no doubt takes his name from the fact that he brings the "glad tidings" of the introduction of Christianity into Armenia. He claims to have written his book by order of King Trdat (Tiridates) III, not from earlier accounts, but as an eye-witness of the events described. The Armenian text itself does not go back beyond about 450, although it preserves fragments of two older writings. Really historical details, worthy of credence, are unfortunately put side by side with legendary circumstances, unworthy of belief. It seems that Gregory, while an infant, was conveyed by a Christian nurse from Armenia to Cæsarea in Cappadocia to escape being slain with his family for the crime of his father, a Parthian named Anak, who had assassinated Chosrov I, king of Armenia. When he reached manhood he married a Christian lady of Cæsarea, who after bearing him two sons retired to a monastery. Thereupon Gregory entered the services of Chosrov's son, Tiridates III, who, with the help of the Romans, had recovered his father's throne. Tiridates imprisoned him for 14 years in a deep pit, for refusing to perform an act of idolatrous worship, whereupon the tyrant was punished by a horrible temper and his people were plagued. Gregory cured both, converting the king to Christianity. About 302 Gregory was consecrated bishop and catholicos of Armenia by Leontius of Cæsarea. Tiridates established Christianity as the national religion of Armenia as Constantine did several years later for the Roman Empire. In 331 Gregory retired into solitude and died shortly thereafter. The Armenians, the Syrians and the Byzantine Church keep his feast on 30 September; 1 October is his feast in the Roman calendar. Consult Davidson, Lionel, 'Gregorius (7), St., The Illuminator' (in Smith and Wace, 'A Dictionary of Christian Biography,' Vol. II, London 1880); Bardenhewer, Otto, 'Les Pères de l'Église: leur Vie et leurs Oeuvres' (tome 3, Paris 1899); Chevalier, Ulysse, 'Bio-Bibliographie' (Paris 1905).

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GREGORY, Saint, of Nazianzus, known as THEOLOGUS ("THE THEOLOGIAN" or "THE DIVINE"): b. Arianzus, near Nazianzus, a little city in southwestern Cappadocia, about 325; d. there about 389 or 390. Receiving the seeds of a truly Christian education from his mother, Nonna, he attended in turn the most celebrated schools of his time. From Cæsarea in Cappadocia he went to Cæsarea in Palestine, thence to Alexandria and finally to Athens, where his friend, Saint Basil of Cæsarea (q.v.), was not slow in joining him. Gregory apparently stayed in Athens longer than his friend and possibly gave lectures on oratory there, but when about 30 years of age he returned to his native land to be baptized. Thenceforth he divided his life between Arianzus and the monastic retreat of Basil in Pontus. Gregory's life presents the unusual picture of alternate retirement and activity, like the ebb and flow of the sea. It was only the insistence of his friends and his own conscience which dragged him forth from the longed for solitude and silence of contemplation and forced him to take a vigorous part in the struggles and trials of the Church. Filial love and zeal for orthodoxy brought him forth from his retreat first in 360 or 361 as a messenger of peace to his compatriots. His father, also named Gregory, who was bishop of Nazianzus (329–374), through weakness or misunderstanding had subscribed (359) to the semi-Arian formula of Rimini, bringing upon himself the opposition of the faithful. The son's happy intervention resulted in a solemn profession of faith by the elder Gregory, at whose hands he was ordained priest somewhat in spite of himself on Christmas Day, 361. After a brief sojourn with Basil in Pontus, Gregory returned to aid his father in the administration of his see. It was not long before Basil constrained his friend to accept the newly created bishopric of Sasima, although it is doubtful whether Gregory ever set foot in that little town. At any rate, in 372, yielding to his father's solicitations, Gregory decided to relieve him somewhat of the burden of his episcopal charge, and, when his father died in 374, soon to be followed by the pious Nonna, he was not slow to console his broken heart by resigning the administration of the Church at Nazianzus and returning to the contemplative life at Seleucia. His younger brother, Cæsarius, and his sister, Gorgonia, had preceded their parents to the grave by several years (369) and there remained to be added but the death of his best friend, Basil (379), to confirm Gregory in his resolution to bid the world a lasting farewell. Nevertheless he was not destined to enjoy the repose he so longingly desired. Arianism under Valens had gained headway in a part of the empire, and the Catholics at Constantinople, despoiled of their churches, felt themselves upon the very verge of utter ruination. They appealed to Gregory, who could not resist the hope of re-establishing the true faith in the capital of the east. Nothing arrested his zeal and his marvelous eloquence triumphed over all. When Theodosius entered the city in 380, the faithful demanded as their bishop the restorer of orthodoxy, but Gregory, although consecrated as such, insisted upon awaiting the outcome of the Second Ecumenical Council of Constantinople, finally resigning his charge and returning in June 381 to Nazianzus, which had been without a head since the death of the elder Gregory. For two years he administered the Church there and about 383 retired to the vicinity of Arianzus, his birthplace, where he died in the austere practice of Christian asceticism. Gregory's works may be divided into three groups: discourses, letters and poems. Of the discourses (which constitute the largest group) 47 are extant, and of these the most important and famous are those (27–31) pronounced at Constantinople in defense of the mystery of the Trinity, which, because of their solid doctrine and vigorous exposition, have been called the 'Theological Discourses' and won for Gregory the title formerly appropriated only to Saint John. The rest of the discourses are on various subjects. There are 243 letters attributed to Gregory, the vast majority of which belong to the days of his retirement at Arianzus (383–389) and give an intimate picture of the life of the author or of his friends and parents. This same period also saw the majority of his poems, which very often are little more than versified prose, although some of his elegiac efforts seem to possess real poetic feeling. The longest of his poems, 'De Vita Sua,' is one of the most valuable sources of information concerning the details of his life. Gregory's complete works appear in Migne's 'Patrologia Græca.' The Eastern Church celebrates 25 and 30 January in his honor and the Western Church 9 May.

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GREGORY, Saint of Neocæsarea, known as THAUMATURGUS (ὁ θαυματουργός, THE WONDER-WORKER): b. Neocæsarea in Pontus, about 210; d. there about 270. Originally bearing the name of Theodorus, he grew up in his native city in a thoroughly pagan atmosphere. On the advice of his Latin tutor, he decided to devote himself to the study of law and, for that purpose, to proceed with his brother, Athenodorus, to the famous schools at Beirut in Phoenicia. However, the naming of their brother-in-law as assessor to the Roman governor of Palestine took them as far as Cæsarea, where they were so charmed by the personality and teaching of Origen that they abandoned their original plan and became wholeheartedly attached to their admired instructor. The latter cleverly won over these distinguished pupils to the study of the Holy Scriptures and thereby, little by little, to the Christian faith. The first meeting of the youthful Gregory with Origen probably took place in 231. His studies under the illustrious scholar continued until 238 or 239, perhaps with the exception of the years 235 to 237 or 238, namely during the persecution of Maximinus Thrax, when it is said that Origen sought refuge in Cappadocia and his disciple at Alexandria. In 238 or 239 Gregory said farewell to Origen and to Cæsarea in a public discourse entitled 'Panegyricus in Origenem,' in which he gives thanks to Origen and shows a sincere enthusiasm for sacred science. Some of the chapters of this discourse have a great historical value. In 240 Gregory was elevated by Phædimus, bishop of Amasea and Metropolitan of Pontus, to the newly created episcopal see of his native city, although there were at the outset only 17 Christians in this jurisdiction. Information concerning the labors of the bishop is obtainable chiefly from the biography by Saint Gregory of Nyssa (q.v.) which is somewhat beclouded by legends and is especially uncertain in its chronology. The biographer states that, before entering upon his duties as bishop, Gregory retired into solitude. One night, in an apparition of the Blessed Virgin Mary and Saint John, he was given a formula of faith, a brief but none the less clear and precise explanation of the dogma of the Trinity, which obtained a very great authority thereafter. Similar to this is the 'Exposition of the Faith' now generally attributed to Gregory. The divers miracles which won for him the title of «wonder-worker» are related at length by Gregory of Nyssa and it is certain that his influence was potent and his renown more than ordinary. In 265, he took part, together with his brother, who likewise held an episcopal see in Pontus, in the great synod of Antioch against Paul of Samosata and perhaps also in the synod held in 269 at the same place against the same heresiarch. Besides the 'Panegyricus' mentioned above, Gregory is the author also of an 'Epistola Canonica' addressed to a bishop in Pontus and treating of the different questions raised on the occasion of the Gothic incursions in Asia Minor (253–258); 'Metaphrasis in Ecclesiasten,' which is only a free paraphrase of the Greek text; 'Dialogus cum Aeliano,' apparently lost; and many other apocryphal writings. Critics have been unanimous in attributing to Gregory the 'Tractatus ad Theopompum' on the divine passibility and impassibility, written in the form of a dialogue and treating of the question whether divine impassibility necessarily supposes that God is indifferent to everything done among men. Gregory's complete works, including the fragments attributed to him, have been published in Migne's 'Patrologia Graeca,' and an English translation of most of them in the 'Ante-Nicene Fathers.' His feast in the Roman Church is observed 17 November.

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GREGORY, Saint, of Nyssa: b. about 335 or 336; d. after 395 or 396. He was a younger brother of Saint Basil of Cæsarea (q.v.), who, it seems, had charge of his education. While holding the office of lector in the Church he yielded to the attractions of the world and became a professor of *belles-lettres,* preferring «the name of rhetorician to that of Christian.» But the lively representations of his friends and especially of his namesake of Nazianzus, persuaded him to return to his first vocation. After retiring into seclusion for a short time, he allowed himself in 371 to be consecrated by his brother Basil and became bishop of Nyssa, a small town in Cappadocia, continuing to live with his wife, Theosebeia, although as with a sister. The hatred of the Arians awaited him in his new field and after a few years of bitter struggle he was deposed about 375 by an Arian synod convoked by the governor of Pontus. The death of the Emperor Valens in 378 brought about a change in the political situation of the Church and Gregory returned from exile to Nyssa in triumph. In the fall of 379 he assisted in the Council of Antioch in opposing the Meletian schism, and two years later enjoyed a very important rôle in the second general council at Constantinople. During the interval he had traveled extensively in fulfilment of a commission which he had received from the Antioch Council «to visit and reform the Church in Arabia.» It is after his last trip to Constantinople in 394 that Gregory's name disappears from history and it is probable that his death followed shortly thereafter. Gregory has few rivals in the 4th century to compare with his fecundity and depth of knowledge. Most of his works are exegetical, as 'On the Creation of Man'; 'The Work of the Six Days'; 'The Defence of the Hexaemeron'; 'On the Witch of Endor'; 2 books on the Psalms, 8 homilies on Ecclesiastes, 15 homilies on the Canticle of Canticles, 5 homilies on the Lord's Prayer, and 8 homilies on the Beatitudes. In the field of metaphysics and theology, the works of Gregory merit particular attention, as 'Against Eunomius'; 'Against Apollinaris'; 'Grand Catechism'; 'Against Tritheism'; 'On Faith'; 'Dialogue with Macrina' (his sister), and others. An ascetic spirit animates three little works dealing with the meaning of the Christian name and the purpose of Christian life, and another work 'On Virginity,' which gives the principles of right living. Gregory's discourses reflect the style of the time, although they do not contain the eloquence of his namesake of Nazianzus. Chief among these discourses are the funeral orations on his brother, Basil, and Meletius and his panegyric on Gregory of Neocæsarea (q.v.). Only 26 letters of Gregory have come down to us. His writings are best collected in Migne's 'Patrologia Graeca.' His feast in the Western Church is observed 9 March.

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GREGORY, Saint, of Tours (originally called Georgius Florentius), historian of the Franks: b. Arverni, the modern Clermont-Ferrand, France, 30 Nov. 538 or 539; d. Tours, 17 Nov. 593, or 594. He belonged to one of those families which called themselves senatorial and which formed the aristocracy of Gaul. After his father's death he was piously taught by his parental uncle, Saint Gallus, bishop of Clermont, and the priest Avitus, who succeeded to that see. Being of very poor health, he made a pilgrimage to Tours in 563 in the hope of curing a serious illness on the tomb of Saint Martin and his hopes were realized. In 573, while at the court of Sigebert I, king of Austrasia, he received the news of his election to the see of Tours by the clergy and people of that city who had had an opportunity to recognize his worth from his 10 years' sojourn in their midst as a pilgrim. Venantius Fortunatus celebrated his elevation in a congratulatory poem, whose praises were fully justified by subsequent events. As a pastor of souls Gregory was devoted to his flock and, in spite of the perils and difficulties of the times, he was prudent as well as courageous in protecting the city of Tours, which at that time was the religious centre of Gaul. He successfully opposed Chilpéric and, after the latter's death in 484, he enjoyed one of the principal rôles in the Frankish empire under Guntram, and especially under Childebert II, whose particular confidence he possessed. Though an active participant in the political and civil life of his times, Gregory did not cease to be an earnest and fecund writer. Besides the 10 books of his ‘Historia Francorum,’ which won for him the merited appellation, «the Herodotus of the Franks,» he is the author also of seven books of ‘Miracles,’ a book on the lives of the Fathers, a commentary on the Psalter, a book on ecclesiastical offices and two other theological works. In the preface to his ‘History’ the author states his intention of transmitting to posterity the knowledge of contemporaneous events. So beginning with the fifth book his ‘History’ is in reality a series of memoirs. The first book begins with the creation of the world and glides rapidly over the centuries up to the death of Saint Martin (397). The second book contains the history of the Church and of barbarism in Gaul; the largest place herein is devoted to the founder of the Frankish monarchy, Clovis. The third book stops at the death of Theodebert I (548) and the fourth at the death of Sigebert I (575), bringing in some of the author's own recollections. The fifth and sixth cover the years 575 to 584 and the remaining four books retrace in detail the years 584 to 585 with a brief summary of the other years up to 591. Gregory is entirely himself when he comes to tell of the events of his own time and he does not forget to mention the part which he took in them. As an historian Gregory merits great confidence and esteem, but he is not an historian in the modern sense of the word. He does not study the connection between events nor analyze their causes, but contents himself with recording and describing that which he knew so well. Apart from the local color and the lives of prominent persons, the natural simplicity and naïveté of the author give to his work a charm and an attraction which more than compensate for the weaknesses of his plan and execution and the defects in his style. Moreover, because of the impossibility of duplicating the material in other sources, it has been said that the ‘Historia Francorum’ is «one of the most precious of all historical literature.» Gregory's complete works have been published in Migne's ‘Patrologia Latina.’ The best edition of his ‘History’ is in the ‘Monumenta Germaniæ Historica.’

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GREGORY I, Saint, Pope (590–604), surnamed «the Great»: b. Rome, about 540; d. there, 12 March 604. Being the son of a wealthy patrician, he naturally embraced a political career and was named prætor of Rome by the Emperor Justin II. The charm of power and terrestrial grandeur seems to have stifled in the soul of the young man the first attractions to the religious life, but he finally heeded the call of grace, sold the goods of his great inheritance and applied the proceeds to the alleviation of the poor and the founding of seven monasteries, six in Sicily and the seventh in Rome, on the present Monte Cœlio in the house wherein he was born. In this monastery he became a monk of the Benedictine rule and observed it with such austerity that his health, not delicate, was ruined and his life threatened. In the years that followed he always longed for the cloister and the return of those happy days. The Pope soon removed him from his cell to name him one of the seven cardinal deacons (*regionarii*) and shortly afterward Pelagius II entrusted to him the difficult and honorable charge of *apocrisiarius* or nuncio to the Emperor Tiberius at Constantinople. Upon the completion of this mission he re-entered his monastery where soon after he was chosen abbot. The sight of some young Anglo-Saxons in the slave-market inspired in him the idea of setting sail for England and taking to that people the benefits of Christianity and of civilization. He had already, with the approval of the Pope, left Rome in secret, when a riot constrained Pelagius II to recall by courier the benefactor of the city and the idol of the Roman people. Pelagius died in 590 and the unanimous votes of the senate, the clergy and the people immediately raised Gregory to the pontifical chair. He spared nothing to escape it. But since the Emperor of the East, Maurice, had confirmed the election, the people conducted him in triumph to Saint Peter's and he was consecrated 3 Sept. 590. At this time Italy was the prey of floods, pestilence and famine; the Lombards were plundering with fire and sword; the ecclesiastical province of Milan persisted in schism which the condemnation of the Three Chapters had evoked; the schism of Photius and of Michael Cerularius was already casting its shadow; and the civilized world seemed upset to its very foundation. Few popes or rulers have united in an equal measure charity and grace with firmness and energy. No Pope perhaps had a more sublime conception of his mission or more completely realized that conception. Gregory displayed great zeal for the conversion of heretics, the advancement of monachism and the rigid enforcement of celibacy among the clergy; and there was nothing in which the Church was concerned that he deemed too small to lie beyond the sphere of his personal interest and action. Although the Patriarch of Constantinople, John the Faster, took the arrogant title of «ecumenical patriarch,» Gregory, though disputing that title, contented himself humbly with that of «servant of the servants of God.» To him is accredited the foundation of the temporal sovereignty of the Holy See and the power of the popes in the Middle Ages, although he never failed to show proper respect for the emperor. The well-known work of Gregory is the conversion of that England whose apostle he had failed to be and to which he had sent Augustine, the future Archbishop of Canterbury, together with

40 other monks of Monte Cœlio. He lived to see the complete success of this enterprise. In his last years, Gregory was almost constantly confined to bed by sickness and could scarcely raise up to celebrate the Holy Sacrifice on great feast days. He, who is acknowledged to have been one of the greatest of all the successors of Saint Peter, died 12 March 604, and the anniversary of his death is celebrated as a duplex feast in the Latin Church. Nothing proclaims more vividly the genius of Gregory and reflects more faithfully his activity than his 'Registrum epistolarum,' a collection of his official correspondence, of which 848 letters in all are extant. From these one gets as it were a birdseye view of the statesman, the talent of the administrator and the indefatigable zeal of the bishop. The best edition of this work is that of Ewald and Hartmann in the 'Monumenta Germaniæ Historica.' The duties of the sacred ministry is explained in the celebrated 'Liber regulæ pastoralis,' written about 591 and dedicated to John, Archbishop of Ravenna, who had reproached the Pope with having tried to avoid the supreme dignity by flight. Gregory justifies himself by the example of Saint Gregory of Nazianzus and Saint Chrysostom, noting the grandeur and difficulties of the pastoral ministry. The book contains four parts: the first outlines the conditions requisite for the priesthood; the second depicts the life of the true pastor; the third (the largest and most important part) traces the rules of preaching; and the fourth (a single chapter) invites the pastor to enter into himself every day. The book had an extraordinary success, was translated into Greek by Anastasius II, Patriarch of Antioch, and into West-Saxon by King Alfred the Great (901). King Alfred's version has been edited by H. Sweet (London 1871) in the 'Publications of the Early English Text Society.' About equally successful were the four books of 'Dialogues,' dating from the years 593–94 and treating of the life and miracles of the holy persons of Italy, including especially Saint Benedict, and the survival of the soul after death. This work was copied and translated and spread throughout the world. Extracts of this work appear in the 'Monumenta Germaniæ Historica.' Another important work was 'Expositio in librum Job sive Moralium libri XXXV,' begun during the nunciature at Constantinople and finished after he became Pope; this involves a threefold plan: a literal or historical explanation, a mystical explanation and a moral explanation. Besides these, Gregory composed 22 homilies on Ezechiel in two books, 40 homilies on the Gospels in two books, the Gregorian Sacramentary, and in all probability eight or nine hymns. Many other works are attributed to him, which are probably spurious. The ancient tradition which reserves to Gregory the honor of having definitely fixed the liturgical chant, 'Cantus Gregorianus,' seems indisputable. (See GREGORIAN CHANT). Gregory is represented in art with a dove above his head, due to the well-known story of Peter the Deacon that a dove rested on his head when he was composing the homilies on Ezechiel. The complete works of Gregory have been reprinted in Migne's 'Patrologia Latina' and translations of selected letters and the book on pastoral care are in the 'Nicene and Post-Nicene Fathers.'

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GREGORY II, Saint, Pope (715–731): b. Rome, year unknown; d. there, 10 Feb. 731. He is said to have been educated in the Lateran palace under Pope Sergius I and a Benedictine monk. After reaching the diaconate, he was chosen by his predecessor, Pope Constantine I, to accompany him to Constantinople, where he displayed his learning and ability by satisfactorily answering certain questions put to him by the emperor, Justinian II. It was not long after Gregory's elevation (19 May 715) before he began to exhibit his great missionary zeal toward Germany. The conversion and subjection to the Roman see of the German races by the English missionary, Saint Winfrid, or Boniface, as he was afterward called, may be attributed in great measure to Gregory's approval and encouragement. It was during Gregory's reign also that the iconoclastic controversy commenced between the pope and the emperor, Leo III, known as the Isaurian or the Iconoclast. The popes at this period were still subjects of the Eastern emperors, coming directly under the emperor's representatives, the exarchs of Ravenna. In 726 Leo published his first iconoclastic edict which forbade the worship of images by genuflexions and the like and ordered them placed high on the walls of the church. A second edict in 730 provided for the absolute destruction of all images and the whitewashing of the walls of the church. A long series of insurrections and plots, some of which were directed against the Pope's life, followed, involving especially the Lombards under Luitprand, who seems to have played fast and loose with both sides. Despite all provocation, Gregory never swerved in his loyalty to the emperor, as is evidenced, for example, by the fact that, when Ravenna fell into the hands of the Lombards, about 727, it was partly by the Pope's exertions that Ravenna was saved to the Byzantine Empire for a year or two longer. However, Gregory was in duty bound to oppose all efforts to destroy an article of faith. From the two famous letters of condemnation sent by him to Leo it is evident that the independent temporal authority of the popes, which in fact began with Gregory, was consciously felt by him. Gregory is also noted for the restoration of churches ruined by the Lombard ravages and the re-establishment of neglected monasteries, particularly Monte Cassino. His biographers say that he was pure of life and resolute in will. About 15 or 16 of his letters are extant. His feast in the Roman calendar is 13 February.

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GREGORY III, Saint, Pope (731-741): b. Syria, year unknown; d. Rome, November or December 741. He succeeded Gregory II in March 731, having been elected by acclamation while attending the obsequies of his predecessor, whose policies he continued during his entire reign. He remonstrated with the emperor, Leo III, only to have his emissaries mistreated. As a result two synods were successively (731 and 733) held in Rome, in which the iconoclastic heresy was condemned. Like his predecessor, Gregory gave support and encouragement to Saint Boniface, whose efforts to propagate the Catholic faith among the German nations were meeting with great success. It was from this Gregory that Boniface received the pallium. The encroachments of the Lombards in Italy had now become so formidable that Gregory sent in succession two embassies to Charles Martel, the second of which promised the leader of the Franks the title of Patrician and Consul of Rome in return for his help against the Lombards. Charles thereupon sent two emissaries to Rome and after their arrival the Lombards withdrew their troops and ceased from hostilities. The death of Charles, which was followed shortly after by that of Gregory, prevented any further immediate results. It is significant, however, that in this way the first step was taken toward the transference of Rome politically from the suzerainty of the Eastern emperors to that of the Frankish rulers of the West. Gregory's biographers say that he was well versed in Latin and Greek and the Holy Scriptures as well as pious and charitable. November 28 is his feast in the Roman calendar. Consult works mentioned under GREGORY II; Barmby, James, 'Gregorius (53) III' (in Smith and Wace, 'A Dictionary of Christian Biography,' Vol. II, London 1880).

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GREGORY IV, Pope (827-844): b. Rome; d. 25 Jan. 844. He was renowned for his learning and piety and through the influence of the Roman nobility was elected successor to Valentinus late in the year 827. Because of a dispute with Louis the Pious, it was not until March 828 that Gregory assumed the active duties of Pontiff. Gregory's reign was troubled with the quarrels between Lothair and Louis the Pious. Gregory favored Lothair at first but the latter's treachery soon made the Pope attach his fortunes to the old Emperor Louis. After the latter's death Lothair became emperor, but was soon after defeated at Fontenay (Fontenoy-en-Puisaye). The Saracens menaced Italy, occupied Sicily and to safeguard Rome Gregory fortified Ostia. He repaired aqueducts and churches, nominated Saint Anschar first archbishop of Hamburg and legate to the Danes, Swedes and Slavs. Gregory gave the pallium to the archbishops of Salsburg, Canterbury and Grado. During his pontificate the observance of the feast of All Saints was made general. Consult Mann, 'Lives of the Popes in the Early Middle Ages' (Vol. II).

GREGORY V, Pope (996-999): b. about 970; d. 4 Feb. 999; sometimes styled BRUNO OF CARINTHIA. He was nephew of the emperor Otto III and through his influence was chosen first German Pope, and at the age of 26 succeeded John XV in 996. He crowned his relative Otto emperor on 21 May 996 and during his entire reign was in absolute concord with his imperial uncle. In the absence from Rome of the latter, Crescentius set up an antipope, John Philagathus, an Italo-Greek, as John XVI. Gregory threatened Robert, king of France, with excommunication if he did not repudiate Bertha, whom he had married, although related to him within the forbidden degrees. Robert yielded at length. On the return of Otto to Rome, the antipope was publicly degraded and deported to Germany. Crescentius was hanged. Gregory bestowed his own pallium on Archbishop Aelfric of Canterbury. This Pope died suddenly and there was a suspicion of foul play. Consult Mann, 'Lives of the Popes' (Vol. IV).

GREGORY V, ecumenical patriarch of the Greek Church: b. Dimitzana, Arcadia, Greece, 1739; d. Constantinople, 1821. His original name was Georgios Angelopulus, and he took his ecclesiastical name on entering the monastery on Mount Athos, where he received his theological training. He was appointed archbishop of Smyrna in 1784 and patriarch of Constantinople in 1795. When the French invaded Egypt in 1798, the national spirit of Greece was aroused by hopes of deliverance from the Turkish yoke. Suspicions of conspiracy fell upon Gregory and the Turks clamored for his head. Sultan Selim therefore banished him to Athos, but he was soon afterward reinstated in his see. In 1821 the Greeks of the Morea revolted and 21 March banishment was proclaimed against all who took part in the rebellion. Gregory had been put in charge of the family of Prince Murusi, who without the patriarch's connivance had been permitted to escape by the Russian ambassador. On Easter morning, 22 April 1821, by command of the sultan Gregory with three bishops and eight of the clergy were hanged in front of the basilica. Three days later the Jews threw his body into the sea, where it was recovered by Greek sailors and carried to Odessa. The Greeks looked upon their murdered archbishop as a martyr, his bones were placed by the government in the cathedral at Athens and his statue was raised in front of the university. Among his writings is a translation of Saint Paul's epistles into modern Greek, with a commentary.

GREGORY VI, Pope (1045-1046): date of birth unknown; d. 1047. As John Gratian, archpriest of Saint Johns, he was renowned for learning. In 1045, Benedict IX, a libertine, wished to marry and, going to Gratian, offered to resign the papacy for a large sum of money. Gratian, in all good faith, wishing to rid the Church of such an unworthy head, paid the stated sum to Benedict and became pontiff in his stead as Gregory VI. His reign was troubled, however, by the machinations of the antipope Sylvester III (John of Sabina) and by Benedict IX, who soon wished to re-establish himself as head of the Church. Nevertheless, Gregory did much to bring about civil and religious order by force of arms, by letters and by councils. Henry III was invited by some members of the clergy and laity to come to Italy and restore order. Late in 1046 he arrived and was met by Gregory, who at the emperor's request summoned a council to meet at Sutri. Sylvester's claim was denied, he was condemned as a usurper and sentenced to imprisonment for life in a monastery. Benedict's claim was denied as he had voluntarily resigned the Papacy. Gregory, upon being informed that by paying Benedict for the Papacy he had been guilty of simony, voluntarily resigned, and with his chaplain Hildebrand (afterwards Gregory VII, q.v.) accompanied Henry to Germany, where he died soon afterward. Consult Mann, 'Lives of the Popes' (Vol. V).

GREGORY VII, Saint, Pope (1073–1085): b. Soana, a little village in Tuscany, between 1020 and 1025; d. Salerno, 25 May 1085. Little is known of his family or early life except that he was of humble origin, but his name, Hildebrand or Hellebrand, seems to point to a Germanic origin. At an early age he went to Rome to be educated at a monastery, where he probably first imbibed the lofty principles of Church reform he afterward advocated. It was here that he made his religious profession as a Benedictine monk. When John Gratian became Pope as Gregory VI, Hildebrand became his chaplain, though but in minor orders, and followed him into exile across the Alps when his title to the papacy was questioned as simoniacal. Hildebrand remained with him at Cologne until his death in 1047, when he withdrew to Cluny, where he resided for more than a year. When Bruno, bishop of Toul, was nominated Pope by the emperor and diet in 1048, Hildebrand accompanied him to Rome, having persuaded him to lay aside the insignia of his office until he should be canonically elected by the clergy and people of Rome. This was Hildebrand's first step toward the emancipation of the Church from secular control. Leo IX (Bruno) created him a cardinal subdeacon and also appointed him administrator of the Patrimony of Saint Peter. In this position he gave prompt evidence of his extraordinary administrative ability. In 1054 Hildebrand was sent to France as papal legate to examine the cause of Berengarius and while he was still at Tours Leo IX died. He was suggested as Leo's successor, but, hastening to Germany and interceding with the emperor, he managed to have Gebhard, bishop of Eichstädt, nominated, and the latter was consecrated Pope as Victor II in 1055. Hildebrand's influence continued to increase under the pontificates of Victor II (1055–57), Stephen X (1057–58), Nicholas II (1059–61) and Alexander II (1061–73). The two most important transactions of Nicholas' pontificate — the celebrated election decree, by which the power of choosing the Pope was vested in the college of cardinals (a decree which with but few modifications remains in force to-day), and the alliance with the Normans — were in large measure the achievement of Hildebrand. Nicholas raised Hildebrand to the archdiaconate of the Holy Roman Church and his successor, Alexander, made him chancellor of the Apostolic See. Alexander died 21 April 1073 and on the following day Hildebrand was unanimously elected Pope by the cardinals, with the due consent of the Roman clergy and people, which at that time was necessary. However, he deferred his consecration until the emperor had approved the election and, after having been ordained to the priesthood, he was consecrated as Gregory VII, 29 June 1073. It was with great reluctance he undertook the great burden, a task whose difficulties no one understood better than he after his close connection with the papacy for 24 years. At the time of his accession, the whole world was given up to wickedness which had even invaded the Church in the form of simony and clerical incontinence. Gregory was prompt in making every effort to stamp out these vices, which were the natural result of the right of investiture exercised by temporal princes. Gregory's relations with the young Henry IV were at first very harmonious, the latter even writing to the Pope acknowledging his past misdeeds, especially in violation of the rights of the Church. In 1074 Gregory started his reform of the clergy by passing decrees against simony and incontinence, a measure which called forth violent opposition throughout Italy, Germany and France. In Germany particularly indignation was aroused and the greater number of bishops received their instructions with manifest indifference; some openly defied the Pope. In France the storm was scarcely less vehement. Gregory, however, did not hesitate to follow up his decrees by sending legates into all quarters, fully empowered to depose immoral and simoniacal clerics. In 1075 another decree was passed forbidding the clergy, under penalty of forfeiting their offices, from receiving investiture of any ecclesiastical dignity from the hands of a layman, and at the same time forbidding the laity, under penalty of excommunication, to attempt the exercise of investiture of the clergy. In keeping with this decree, Gregory deposed the simoniacal prelates appointed by Henry. The latter refused to obey this decree, and Gregory, in 1076, issued a new decree summoning the emperor before a council at Rome, to defend himself. Henry then caused a sentence of deposition to be passed against the Pope by a German council assembled at Worms. The Pope, in return, excommunicated the emperor and all his ecclesiastical supporters, and released all his subjects from their oath of allegiance. Abandoned by his own partisans and to escape being deposed by the Pope, Henry fled across the Alps in the dead of winter to Italy, where he submitted at Canossa (1077) to a humiliating penance. Mindful of Henry's former faithlessness, Gregory compelled him to wait three days at the gate to the castle in the garb of a penitent before he received and absolved him. All this did not change Henry's conduct, so that the German princes elected Rudolph of Suabia to succeed him and in 1080 Gregory renewed the sentence of excommunication against him, because of a threat to create an antipope. Henry carried his threat into effect by causing the Pope to be deposed by the Council of Brixen and by selecting Guibert, the excommunicated simoniacal archbishop of Ravenna, as Pope under the name of Clement III. After Rudolph's death, Henry marched on Rome and after three years finally forced his way into the city in 1084. Gregory had retired to the castle of Saint Angelo, where he refused Henry's overtures and remained a virtual prisoner. Guibert was consecrated Pope and thereupon crowned Henry emperor. Gregory was liberated by Robert Guiscard, Duke of Normandy, but was compelled to flee Rome because of the excesses of his Norman allies. He withdrew to Monte Cassino and later to Salerno, where he died in the following year. Gregory's character was ardent and unyielding. In the pursuit of his ends in guarding the liberties of the Church he spared neither friend nor foe. He carried out his ecclesiastical reforms with unbending rigor. He vigorously prosecuted those of the clergy who broke the law of celebacy, and in his relations wth the emperors vindicated the spiritual authority of the Church as independent of the secular power. He was the first Pope to attempt to depose a temporal prince. This and his rigorous zeal for reform may account for the fact that few men have been more differently judged by their contemporaries and by posterity than he. By his enemies he has been represented as an ambitious man, who aimed at universal dominion, both civil and ecclesiastical, reckless of the means of attaining his object. His great idea was to purify the Church and through its agency to reform and civilize society, and his acts were just such as the condition of the times required for the attainment of these two great purposes. The chief fault of his critics is that they have judged his conduct by the ideas of the present day instead of by the conditions of the times in which he lived. One need only read his correspondence to learn that it all breathes far higher motives than that of worldly ambition. The key to his entire character may be found in the last words attributed to him: «I have loved justice, I hate iniquity, therefore I die in exile.» Gregory VII was beatified by Gregory XIII in 1584 and canonized by Benedict XIII in 1728. The anniversary of his death is a duplex feast in the Roman calendar. Gregory's letters, which treat of the principles and practice of Church government are to be found in Mansi and Horoy (see list below).

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GREGORY VIII (ALBERTO DI MORRA), Pope (1187): b. Benevento, about 1100; d. Pisa, 17 Dec. 1187. He received a good education, entered a monastery and was made cardinal in 1155 by Adrian IV. He was sent to England by Alexander III to report the circumstances surrounding the murder of Saint Thomas à Becket. Alberto was of a gentle and mild disposition and after his elevation to the Papacy tried to effect a reconciliation with Barbarossa. Just previous to his election the Holy Land fell under the complete sway of the Moslems and the new Pope exhorted the Christian princes to undertake a new crusade for the reconquest of the holy places. This Pope absolved Henry II of England for the murder of Becket. Consult Nadig, 'Gregoro VIII 57 tägiges Pontifikat' (Basle 1890).

GREGORY IX (UGOLINO, COUNT OF SEGNI), Pope (1227–1241): b. Anagni, about 1145; d. Rome, 22 Aug. 1241. He was educated at Paris and Bologna and in 1298 was created cardinal-deacon of Sant' Eustachio. In 1207 he was sent as papal legate to Germany and accomplished a similar mission two years later. During the pontificate of Honorius III Ugolino was despached on several diplomatic missions to northern Italy and in 1221 was commissioned to preach a crusade. On 19 March 1227 Cardinal Ugolino was elected to the Papacy and assumed the name of Gregory IX. The principal events of his pontificate were the various incidents of his contest with the great emperor Frederick II, whom he four times excommunicated, absolving his subjects from their allegiance, and proclaiming a crusade against him. Gregory was worsted in this conflict and from 1228 to 1230 was a fugitive at Perugia. Peace with Frederick was concluded 1–3 Sept. 1230. It was not a lasting peace, however; in 1237, angered by the actions of Frederick, Gregory formed an alliance with the Tuscans, Umbrians and Lombards and a gigantic struggle between the empire and papacy was soon being waged. Gregory IX was a great friend of the mendicant orders. He canonized Saint Francis of Assisi, one of the glories of the Church. Gregory also aspired to heal the breach with the Eastern Church and initiated negotiations to bring about that object. The obstinacy of the Greeks rendered his efforts futile. Perhaps his greatest achievement was the collection of the papal decretals, completed in 1234. Consult 'The Catholic Encyclopedia' (New York 1914); 'Vita Gregorii IX' (in Muratori, 'Rerum Italicorum Scriptores,' Milan 1728); Balan, 'Storia di Gregorio IX e dei suvi tempi' (3 vols., Modena 1872–73).

GREGORY X (TEOBALDO VISCONTI), Pope (1271–1276): b. Piacenza, 1210; d. Arezzo, 10 Jan. 1276. He was for some time in the service of Cardinal Jacobo; was made archdeacon of Liège and accompanied Ottoboni to England. After the death of Clement IV, in 1268, the

Holy See was vacant for nearly three years, the cardinals being divided into two national groups, French and Italian. Teobaldo Visconti, at the time of his election (1 Sept. 1271) was not even a priest and was at Acre with Prince Edward of England, on a pilgrimage to the Holy Land. He returned home, entering Rome 13 March 1272; was ordained priest on the 19th and consecrated Pope on the 27th. He at once set about the establishment of peace between Christian rulers and summoned a general council to meet at Lyons 1 May 1274. Gregory recognized Rudolf of Hapsburg as emperor, thus setting aside the claims of numerous rivals of Rudolf. Gregory caused great sums to be collected for a crusade, which, however, was not carried out. (See LYONS, COUNCILS OF). Consult Bonucci, 'Istoria del pontefice Gregorio X' (Rome 1711); and Hefele, 'Konziliengeschichte' (Vol. VI).

GREGORY XI (PIERRE ROGER DE BEAUFORT), Pope (1370–1378): b. Maumont Castle, near Limoges, 1331; d. Rome, 27 March 1378. His uncle, Clement VI, granted him several benefices and made him cardinal in 1348. He studied at Perugia and became deeply learned in canon law and theology. On 30 Dec. 1370 he was elected Pope at Avignon in succession to Urban V; was ordained priest on 4 Jan. 1371 and crowned Pope as Gregory XI on the following day. He tried to effect a union with the Eastern Church; executed several reforms and undertook a crusade. His pontificate was troubled with the state of affairs in Italy. Gregory made war on Duke Bernabo, Visconti of Milan, and with the aid of the emperor, the king of Hungary, the Queen of Naples and the Englishman, John Hawkwood, compelled Bernabo to sue for peace in 1374. Florence was laid under interdict and its inhabitants outlawed because of its having instigated revolts in the Papal States. Saint Catherine of Siena was sent to Gregory to intercede for the Florentines. Saint Catherine induced Gregory to abandon Avignon and remove to Rome, and on 17 Jan. 1377 he entered the city. Gregory was the last Pope of French nationality. He was a learned man and full of zeal, though not free from nepotism. Consult Drane, 'History of Saint Catherine of Siena' (New York 1899).

GREGORY XII (ANGELO CORRARIO, now CORRER), Pope (1406–1415): b. Venice, 1327; d. Reconati, 18 Oct. 1417. In 1380 he became bishop of Castello, in 1390 titular patriarch of Constantinople. In 1405 he was elevated to the cardinalate. On 30 Nov. 1406 he was chosen to succeed Innocent VII and assumed the name of Gregory XII. The antipope Benedict XIII was at this time installed at Avignon and Gregory agreed to resign if Benedict would do likewise. Both Gregory and Benedict wavered and gave indications that they were unwilling to lay aside the tiara. As a result some of Gregory's cardinals met with the cardinals of Benedict and agreed to convene a general council at Pisa at which both pontiffs should be deposed. The council deposed Gregory on 5 June 1409 and elected Alexander V. Gregory was still recognized by many princes. On 4 July 1415 at a session of the Council of Constance Gregory, through his proxy, resigned the papacy, and by the cardinals he was made bishop of Porto and perpetual legate at Ancona. Consult Salembier, 'The Great Schism of the West' (New York 1907).

GREGORY XIII (UGO BUONCOMPAGNO), Pope (1572–1585): b. Bologna, 7 Jan. 1502; d. Rome, 10 April 1585. He studied law at the University of Bologna, receiving the doctorate in both laws in 1530, and afterwards taught jurisprudence there for some years. He was the recipient of various eccleciastical appointments from Paul III, Julius III and Paul IV in succession. The latter sent Gregory as his confidential deputy to the Council of Trent, where he had been in 1545 as one of Paul III's jurists. On his return thence he was created cardinal priest in 1564 and on the death of Pius V was elected pope on 13 May 1572. Although his youth had not been spotless, he realized the responsibilities of his high position and was active in church reforms, pledging himself to carry into execution the decrees of the Council of Trent, and was extremely zealous in the promotion and improvement of education. He founded numerous colleges and seminaries at Rome and elsewhere, even as far away as Japan, and put most of them under the direction of the Jesuits, whose rapid spread during his pontificate was greatly due to his encouragement and financial assistance. Gregory's name, however, is especially associated with the reformation of the Julian calendar (see CALENDAR) which was the result of long consideration and was introduced in most Catholic countries by the bull of 24 Feb. 1582. Under his care was published also a new and greatly improved critical edition of the 'Corpus Juris Canonici,' a project which had been inaugurated by Pius IV shortly after the conclusion of the council of Trent. Gregory's efforts to secure religious liberty for Catholics in England, partly through expeditions to Ireland, were without avail, although he was strongly supported by Philip II of Spain. The large sums of money expended by Gregory in his many benefactions reduced the papal treasury to such an extent that he felt constrained to confiscate various castles and properties in the papal dominions upon one pretext or another, thereby producing a state of unrest and disfavor which finally led to bloodshed and banditry only suppressed by Gregory's successor, Sixtus V. Gregory has been the object of severe criticism for his celebration in Rome of the horrible massacre of the Huguenots on Saint Bartholomew's Day in 1572. It must be remembered, however, that even if he was at that time aware of the circumstances of the massacre (which is not at all evident), he did not rejoice at the bloodshed, but at the suppression of a rebellion against the state as well as the Church. Contemporaries relate that he even shed tears when he learned of the massacre.

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GREGORY XIV (Niccolo Sfondrati), Pope (1590–1591): b. Somma, near Milan, 11 Feb. 1535; d. Rome, 15 Oct. 1591. He was educated at Perugia and Padua and in 1560 was made bishop of Cremona. He was present at the Council of Trent, 1561–63, and was elevated to the cardinalate in 1583. On 5 Dec. 1590 he was elected Pope in succession to Urban VII. He was a companion of Charles Borromeo and a friend of Philip Neri, both since enrolled in the canon of saints. Gregory was very pious and upright, but was little versed in statecraft. He opposed Henry of Navarre and assisted the French League in its efforts to depose the French king. In all this he was the unconscious tool of Philip II of Spain. On 18 April 1591 Gregory ordered that reparation wherever possible be made to the Indians of the Philippines by the Spaniards and that all Indian slaves in those islands be set free at once. Consult Ranke, 'History of the Popes' (London 1906).

GREGORY XV (Alessandro Ludovisi), Pope (1621–1623): b. Bologna, 9 or 15 Jan. 1554; d. Rome, 8 July 1623. He was educated by the Jesuits at Rome and also at the University of Bologna. He was made judge of the capitol by Gregory XIII; was made archbishop of Bologna by Paul V in 1612 and created cardinal in 1616. On 9 Feb. 1621 he was chosen successor to Paul V. He promulgated a new regulation concerning papal elections and introduced a secret ballot. In 1622 he established the Congregatio de Propaganda Fide, having charge of missions all over the world. In the same year he canonized Ignatius of Loyola and Francis Xavier, both of the Jesuit order, also Philip Neri and Theresa, and the Spanish plowman, Isidore. During the Thirty Years' War Gregory supported the emperor and aided the king of Poland in his struggle with the Turks. His relations with England were more friendly than had been those of his predecessors and throughout Europe a general leniency toward Catholics was noticeable during his pontificate. Consult 'The Catholic Encyclopedia' (New York 1914); and Ranke, 'History of the Popes' (London 1906).

GREGORY XVI (Bartolommeo Alberto Cappellari), Pope (1831–1846): b. Belluno, in Venetian territory, 18 Sept. 1765; d. Rome, 1 June 1846. At the age of 18 he entered the Camaldolese order, taking the name Mauro, and in 1787 he was ordained priest. In 1799 he published a work against the Italian Jansenists entitled 'Il Trionfo della Santa Sede,' which ran through several editions in Italy and was translated into several other European languages. In this book he upheld the infallibility of the pope and his temporal sovereignty. After receiving a number of ecclesiastical appointments, including the office of Vicar-General of his order, he was created cardinal by Leo XII on 21 March 1825, and shortly after was made prefect of the Congregation of Propaganda, a position which was in effect Minister of Foreign Affairs. As Prefect of Propaganda, he was entrusted with the adjustment of a concordat regarding the interests of the Belgian Catholics and the Dutch Protestants in 1827 and with negotiations with the Sultan looking toward the emancipation of the Armenian Catholics in 1829. On 2 Feb. 1831, after a conclave lasting 64 days, he was unexpectedly elected Pope to succeed Pius VIII. Being a firm believer in autocracy, Gregory was opposed to even a minimum of democratic progress, as were most of the rulers of his time. His rule was a period of no ordinary interest and difficulty in the relations of the Vatican with the temporal powers of Christendom and perhaps he was not fully able to cope with these problems. In his public life, Gregory was very active in his conduct of affairs, although he left the papal treasury in difficulties by his bad financial administration. This was due in part to his liberal patronage of architecture, engineering, literature and art. In his private life, he was noted for his piety and his simplicity.

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GREGORY, Benjamin, English clergyman: b. 1820; d. 1900. He received his education at Woodhouse Grove School; was ordained a minister in the Weslyan Methodist church in 1840; in 1869 became one of the connectional editors, and from 1880–83 sole editor of the church. He published 'The Holy Catholic Church, The Communion of the Saints' (1873); 'The Thorough Business-Man, Memoir of Walter Powell' (1872); 'Side-Lights on the Conflicts of Methodism' (1899).

GREGORY, Caspar René, American theologian: b. Philadelphia, 9 Nov. 1846; d. France, 9 April 1917. He was the son of Henry Duval Gregory (1819–97) the American classical educator; his great-grandfather was a French soldier named Grégoire who had settled in Santo Domingo about the middle of the 18th century. On graduating from the University of Pennsylvania in 1864 Gregory taught for three years at a classical academy in Philadelphia of which his father was principal 1845–72. Meanwhile he studied at the reformed Presbyterian theological seminary in that city and later at Princeton theological seminary, whence he was graduated in 1873. Here he assisted in the production of Professor Hodges' 'Systematic Theology,' revising manuscripts and proof. In 1873 he went to Europe, visiting England, Germany and Switzerland, continuing his studies in Leipzig, where he received his Ph.D. degree and settled as pastor of the American chapel, 1878–79. In 1884 he was attached to the theological faculty of the University of Leipzig, becoming successively privat-docent, professor extraordinary, and ordinary honorary professor. During 1883 he traveled through Europe visiting libraries and universities to study Greek New Testament manuscripts; on the same quest he later visited Greece, Mount Athos and Constantinople. On the outbreak of the European War in 1914 Gregory, who had then been domiciled in Germany about 40 years, volunteered as a private in the German army. He celebrated his 70th birthday at the front on 9 Nov. 1916, when he was promoted to sergeant-major. On 9 April 1917 he was killed by a shell splinter which penetrated the room where he was lying with a crushed leg caused by falling from his horse. Gregory's contributions to theology were considerable, and numerous honors were conferred on him. During 1898 and 1901, and again in 1911–12 he made a lecturing tour through the United States and Canada. In 1876 he became assistant editor of Leipzig *Theologische Literatur-Zeitung*. He was elected to the chair of New Testament Greek in Johns Hopkins University in 1885, but declined the appointment. In 1891 he became a member of the American Philosophical Society and received the degree of D.Th. at Leipzig in 1893. He translated Luthardt's ‘Origin of the Fourth Gospel’ into English and published ‘Les cahiers des mss. grecs’ (1885); Prolegomena to Tischendorf's ‘Novum Testamentum Græce’; ‘Textkritik des neuen Testaments’ (1900–09); ‘The Writings of Charles Weslsey’ (1910); ‘Vorschläge für eine kritische Ausgabe des neuen Testaments’ (1911).

GREGORY, Daniel Seelye, American clergyman and editor: b. Carmel, N. Y., 1832; d. 1915. He studied at Princeton College and Princeton Theological Seminary. After teaching rhetoric at Princeton, and serving as pastor in several places, he became professor of metaphysics and logic at Wooster University in 1871. In 1875 he was appointed professor of English literature at this institution, a position which he left in 1878 in order to accept the presidency of Lake Forest University where he remained for eight years. He was managing editor of the ‘Standard Dictionary’ (1890–94); editor of the *Homiletic Review* (1895–1904); and managing editor of the ‘Bible Student and Teacher’ (1904). He is the author of ‘Christian Ethics’ (1875); ‘Why Four Gospels?’ (1877); ‘The Tests of Philosophic Systems’ (1886); ‘The Church in America and its Baptisms of Fire’ (with S. B. Halliday, 1896); ‘The Crime of Christendom’ (1900); ‘Bible League, Prime No. I’ (1904); ‘Constructive Studies in John, the Gospel for the Christian’ (1909).

GREGORY, Eliot, American painter and author: b. New York, 13 Oct. 1854; d. New York, 1 June 1915. He studied at Yale, obtained his education in art at Rome, and at Paris as a pupil of Cabanel and Carolus-Duran, and exhibited both sculpture and painting at the salon. His pictures include genre works and portraits, among the latter being those of Admiral Baldwin, Ada Rehan and August Belmont. Other well-known canvases by him are ‘The Soubrette’ (1883); ‘Coquetterie’ (1884), and ‘Children.’ He was a chevalier of the Legion of Honor and a director of the Metropolitan Opera Company and was a founder of the New Theatre, New York. His books, published under the pseudonym «An Idler,» are ‘Idler Papers’: ‘Worldly Ways and By-Ways’ (1898); and ‘The Ways of Men’ (1900), containing satirical observations on American life, especially that of plutocratic society.

GREGORY, Elisha Hall, American surgeon: b. Logan Co., Ky., 1824; d. 1906. He received his doctor's degree from the medical college at the University of Saint Louis, practised at Saint Louis; and became professor of surgery at the Saint Louis Medical College, Washington University, 1851. He was elected president of the State Board of Health of Missouri, of the Saint Louis Medical Society, of the State Medical Association of Missouri and of the American Medical Association (1887).

GREGORY, Francis Hoyt, American admiral: b. Norwalk, Conn., 1789; d. 1866. He was appointed midshipman in the United States navy in 1809, and during the War of 1812 was attached to the command of Commodore Chauncey on Lake Ontario. He was captured by the English in 1814 and confined till the close of hostilities. He saw service in repressing the Algerine pirates (1815–16) and the buccaneers of the West Indies (1821–23); took part in the Mexican War and commanded the African squadron (1849–52). He retired with the rank of rear-admiral in 1862.

GREGORY, Herbert Ernest, American geologist: b. Middleville, Mich., 1869. After studying at Yale University, where he received his Ph.D. in 1899, he taught biology, physical geography and physiography there and succeeded to the chair of geology in 1904. He was appointed geologist on the United States Geological Survey; served as associate editor of the *American Journal of Science*; and was one of the authors of ‘Physical and Commercial Geography’ (1910). His geological researches relate chiefly to the State of Connecticut.

GREGORY, Isabelle Augusta, Lady, Irish authoress. She is the youngest daughter of Dudley Persse of Roxborough, County Galway, and in 1881 married Sir William Gregory, formerly member of Parliament for County Galway and for Dublin, and Governor of Ceylon. He died in 1892. Lady Gregory edited his letters two years later, and subsequently launched upon a literary career. In 1898 appeared ‘Mr. Gregory's Letter-Box,’ an edition of the letters of William Gregory, her husband's grandfather, who had been undersecretary of State for Ireland. About this time the movement which came to be known as the Irish Literary Revival (q.v.) held the attention of all those who were interested in national literary history. Through her friendship with William Butler Yeats (q.v.), Lady Gregory became deeply engrossed in this movement and soon occupied a conspicuous place in its promotion. Her first important contributions were her translations of ‘Cuchulain of Muirtemne’ (1902), and ‘Gods and Fighting Men,’ in which she displayed that rare felicity in translation and keen sympathy with her subject which became the distinguishing characteristics of her later work. It was in connection with the Irish Literary Theatre (now the Abbey Theatre, Dublin) that Lady Gregory's best talents were displayed. Her lively dramatic sense and ability to render fluently the quaint turns of the Anglo-Irish idiom, combined with her rare judgment and managerial ability were important factors in making the venture permanent. The story of the persons interested and of the struggle of the theatre to maintain itself is told in her ‘Our Irish Theatre’ (1913). She rendered constant assistance to Yeats, collaborating with him in ‘The Unicorn and Other Plays’; and also, if George Moore's testimony can be accepted, in ‘Kathleen ni Houlihan’ and ‘A Pot of Broth.’ Besides these, she has made striking adaptations in the idiom from Molière, under the title ‘The Kiltartan Molière’ (1910); from Sudermann's ‘Teja’ (1908), and from Goldoni's ‘Mirandolina’ (1910). Her other works comprise folk tales, essays and plays, among which may be noted ‘Ideals in Ireland,’ a series of articles by prominent Irish authors, of which she was the editor (1901); ‘Poets and Dreamers’ (1903); ‘The Book of Saints and Wonders’ (1907); ‘The Kiltartan Wonder Book’ (1910); ‘Seven Short Plays’ (1910); ‘The Image’ (1910); ‘Irish Folk History Plays’ (1912); ‘The Kiltartan History Book’ (1912); ‘New Comedies’ (1913); ‘The Rising of the Moon’ (1915); ‘The Golden Apple’ (1916); and ‘Visions and Beliefs’ (1916). In 1911–12, and again in 1913, she visited the United States with the Irish Players and was enthusiastically received. Consult Weygandt, ‘Irish Plays and Playwrights’ (Boston 1913); and Moore, George, ‘Hail and Farewell’ (New York 1911–13).

GREGORY, James, Scottish mathematician: b. Aberdeen, 1638; d. 1675. He received his education at Marischal College, Aberdeen, and in 1661 invented the reflecting telescope. A description of this is contained in his ‘Optica Promota’ (1663). Several years later he resumed his studies at Padua. He became a member of the Royal Society at London; professor of mathematics at Saint Andrews (1669), and at the University of Edinburgh (1674). His other works are ‘Vera Circuli et Hyperbolae Quadratura’ (1667); ‘Geometricæ Pars Universalis’ (1668); ‘Exercitationes Geometricæ’ (1668).

GREGORY, James, Scottish physician: b. Aberdeen, 1753; d. 1821. He was the son of John Gregory (q.v.). He was educated at Edinburgh, at Christ Church, Oxford and at various universities on the continent. He became professor of medicine at Edinburgh 1776, lecturer at the Royal Infirmary, and professor of medical practice at Edinburgh (1790). He was distinguished as a practitioner and lecturer and took part in the various controversies of the period. His violent opposition to the granting of greater freedom to the medical faculty at Edinburgh incurred the displeasure of that institution and he was finally suspended. Among his publications are ‘De Morbis Coeli Mutatione Melendis’ (1774); ‘Conspectus Medicinæ Theoreticæ’ (2 vols., 1780–82); ‘Theory of the Moods of Verbs’ (1790); ‘Philosophical and Literary Essays’ (1792); ‘Memorial to the Managers of the Royal Infirmary’ (1780); ‘Historical Memoirs of the Medical War in Edinburgh in the Years 1785–86–87’; ‘Epigrams and Poems’ (1810).

GREGORY, John, Scottish physician: b. Aberdeen, 1724; d. 1773. He was the grandson of the mathematician James Gregory (q.v.). After receiving his degree from King's College, Aberdeen, he studied further at Edinburgh and Leyden. From 1746–49 he was professor of philosophy at King's College; and of the practice of physic at Edinburgh 1766. His collected works were printed at Edinburgh 1788.

GREGORY, Olinthus Gilbert, English mathematician: b. Yaxley, Huntingdonshire, 1774; d. 1841. From 1807–1838 he was professor at the Royal Military Academy, Woolwich. His experiments in sound velocity were most valuable. He was editor of the *Gentleman's Diary* (1802–19); *Ladies' Diary* (1819–45). Others of his publications include papers on mechanics and astronomy; ‘Letters on the Evidences of the Christian Religion’ (1815); ‘Memoirs of John Mason Good’ (1828); and ‘Robert Hall’ (1833).

GREGORY, Robert, English clergyman: b. 1819; d. 1911. He studied at Corpus Christi College, Oxford, and from 1843–53 was curate at Bisley, Panton, Wragby, and was rector of Saint Mary the Less at Lambeth (1853–73). In 1868 he was appointed canon of Saint Paul's Cathedral, becoming dean in 1891. He was author of ‘A History of Elementary Education’ (1895); ‘Lectures at Saint Paul's’; and an ‘Autobiography’ which was edited by W. H. Hutton (London 1912).

GREGORY, Stephen Strong, American lawyer: b. Unadilla, N. Y., 1849. He studied at the University of Wisconsin, receiving his LL.B. in 1871. After several years of law practice at Madison, Wis., he acted as special counsel for the city of Chicago before the Supreme Court of the United States in the Lake Front Case. He also defended the conspiracy case against Eugene V. Debs. He was elected president of the Chicago Bar Association (1900); of the Illinois State Bar Association (1904); and of the American Bar Association (1911).

GREGORY, Thomas Watt, Attorney-General of the United States: b. Crawfordsville, Miss., 6 Nov. 1861. He was graduated from the Southwestern Presbyterian University at Clarksville, Tenn., and from the University of Texas. He practised at Austin, Texas, and was counsel for that State in anti-trust proceedings. He was appointed special Assistant Attorney-General of the United States in charge of the investigation and prosecution of the New York, New Haven and Hartford Railroad Company in 1913; and in 1914 succeeded to the office of Attorney-General.

GREGORY, Order of Saint, a papal order established in 1831 under Gregory XVI. It was awarded originally for distinguished defense of the Roman Church, but now is granted for any meritorious work.

GREGR, grĕ'gr', **Eduard,** Czech politician: b. Brezhard 1829; d. 1907. He received a medical education at Prague, and with his brother Julius (q.v.) took an active share in the progressive national party. He was also one of the founders of the Young Czech party of whose policies he was a brilliant leader. He sat in the Bohemian Diet in 1861, and in the Imperial Reichsrat in 1883.

GREGR, Julius, Czech politician: b. Brezhard, 1831; d. 1896. He was the brother of Eduard Grégr (q.v.). After receiving his education at Prague, he entered politics as an ardent nationalist. He served in the Bohemian Diet for nearly 35 years where he resisted encroachments on the autonomy of Bohemia with all the power of his pen and legislative ability. He founded the Young Czech party which was opposed to the Old Czech feudalist interests, and resigned from the Austrian Reichsrat in 1880 because of this hostility. With Reiger and Palacky, he established the nationalist Czech paper *Národoni Listy* in 1861.

GREIF, grīf, **Martin**, German dramatist and poet: b. Speyer, 1839; d. 1911. After studying at Munich, he began his literary work which includes lyric poetry of enduring quality and several dramas of indifferent success. He wrote many of his works under the pseudonym FRIEDERICH HERMANN FREY. His poems include ‹Gedichte› (1868); ‹Neue Lieder und Mären› (1902); his dramas are ‹Nero› (1877); ‹Marino Falieri› (1879); ‹Konradin› (1889); ‹Ludwig der Bayer› (1891); ‹Francesca da Rimini› (1892); ‹Agnes Bernauer› (1894); ‹Hans Sachs› (1894); ‹General York› (1899); ‹Schillers Demetrius› (1901).

GREIFSWALD, grīfs-vält, Pomerania, capital of the district of Greifswald on the Ryck River, 18 miles southeast of Stralsund. The most interesting ancient buildings are the church of Saint Nicholas, a fine example of mediæval architecture, the town hall and some of the university structures. Of the modern buildings are the gymnasium, the dairy school and the geographical and scientific museum. The university dates from 1456 and comprises the faculties of theology, jurisprudence, medicine and philosophy. In 1914–15, there were 98 teachers and 1,109 students. Its extensive library contains some 250,000 volumes, and many historical manuscripts; the old Croy tapestry, on which is depicted a scene in the life of Luther; and numerous valuable antiquities, some of them antedating the Christian era. In connection with the university are botanical gardens and zoological museums. The chief manufactories are railway shops, machine works, foundries, electrical works, shipbuilding yards and chain works. Fishing is extensively carried on, and the trade is mostly in grain, wood and dried fish. The town was admitted to the Hanseatic League in the 13th century. It became Swedish property in 1631 and was finally captured by Prussia in 1815. Pop. 25,000.

GREIN, grīn, **Christian Wilhelm Michael**, German philologist: b. Willingshausen, Hesse, 1825; d. Hanover, 1877. He studied at Marburg and Jena. The elector of Hesse appointed him keeper of the archives at Cassel in 1865.

GREIZ, grīts, capital of the principality of Reuss, Germany, on the White Elster River, 50 miles south of Leipzig. The river divides the old town from the new. Picturesque buildings are the old castle, the prince's residence and the Rathaus. There is also a gymnasium, a realgymnasium, a textile school and a seminary. About half of the population works in the textile mills which are very extensive and constitute the chief industry of the city. Pop. 23,000.

GRELL, Eduard August, German organist: b. Berlin, 1800; d. 1886. He studied with Kaufmann, Ritschl and Zelter. In 1817 he became director of the Singakademie, a post which he held for 20 years. He also was court organist, instructed the cathedral choir; and taught the students at the Academy in composition. His works are largely sacred vocal compositions. They include an oratorio ‹Die Israeliten in der Wüste›; a mass in 16 parts; and various organ and choral pieces.

GRENADA, Miss., city and county-seat of Grenada County, 98 miles south of Memphis, Tenn., on the Illinois Central and the Yazoo and Mississippi Valley railroads. Its government is by mayor and council. Grenada College (for women) is located here. The chief manufactories are cottonseed-oil mills and a brick plant. The municipality owns and operates its electric-light and water plant. Pop. about 3,000.

GRENADA, grĕn-ā'dą, and **GRENADINES**, islands of the West Indies. Grenada is the most southern of the Caribbean chain, and may be characterized as the most British and the most beautiful of all the British Antilles. Its length is 18 miles, its width 7, and its area 133 square miles. Lofty volcanic craters rise high above fertile and well-watered valleys. The volcanic character of the island is perhaps more marked, and is certainly regarded by geologists as being more recent than that of the northern Caribbees. A lake two miles in circumference lies among the mountains just mentioned, at an altitude of 3,200 feet. Saint George's, the capital, has a good harbor, a fort, pretty houses and churches, excellent schools, roads, waterworks, etc. The chief product is cocoa. Pop. 71,082 of which four-fifths are negro peasants. The Grenadines are long, low islands «of quaint forms and euphonious names,» lying between Grenada and Saint Vincent. The largest of those connected politically with Grenada is Carriacou, the area of which is 6,913 acres and population 6,836.

GRENADE, grę-nād', a small hollow ball, cylinder, or cube, of metal, glass, or paper, about two and one-half inches in diameter, which is filled with some explosive, and burst by means of a fuse when it falls among the enemy. Until about the end of the 17th century trained soldiers called grenadiers threw grenades by the hand. Grenades have been delivered from mortars, to repel the close attacks of besiegers sheltering themselves under the besieged walls. This is in anticipation of the modern trench-mortar. They have been found useful also in repelling boat attacks. Grenades were one of the earliest forms of explosive projectiles.

Grenades have again come into military use in the 20th century. Crude bombs made on the spot were employed in the Russo-Japanese War and during the first months of the Great War. A popular form consisted of a jam tin filled with broken iron, with a stick of tri-nitro-toluol in the middle, set off by a fuse. Another much used form was the «hair-brush,» in which the explosive and iron were bound to a board not unlike the back of a brush, in order to obtain greater convenience in throwing. These were soon superseded by more elaborate devices, among which the best known is the Mills bomb. This consists of an oval casing, deeply scored to secure better fragmentation, filled with high explosive, and set off by a detonator five seconds after the handle grasped in the palm of the hand is released. This handle is safely secured by a fastening until immediately before the bomb is thrown. Grenadiers form perhaps the most numerous single class of soldiers in a modern company of infantry.

For ranges greater than those which can be reached by a hand grenade, a rifle grenade is employed. This fastens on an ordinary rifle barrel, and is cylindrical in shape, being scored in a manner like that of a hand grenade. It is projected either by the explosion of a blank cartridge, or by the blast from the muzzle of a gun firing an ordinary ball cartridge. Hand-grenades are in use at the present time as fire extinguishers, chemicals being used to fill hollow glass balls, which are thrown into a burning mass. Many hotels, hospitals and public buildings are equipped with hand-grenades.

GRENADIER, properly, a soldier who carried and hurled grenades; in general, a member of a company attached to a regiment or battalion, taking part on the flanks, also the member of a special regiment or corps. In modern armies the term has been revived and each infantry company now includes rifle grenadiers. In the great war of the nations hand grenades again came into fashion but were hurled by infantry not specially designated as grenadiers.

GRENADIER, a fish family (*Macruridæ*) which frequents the deeper parts of the ocean. Although allied to the cods, very few species are edible. Their life at great depths has developed their eyes greatly as in the case of other deep-sea fishes. On this account they are often termed pop-eyes or onion fish. They are well known to fishermen as they are noted destroyers of bait. Among the genera of this family are the *Macrurus rupestris,* common in the North Atlantic Coast of America, the Bathygadus, Chalinura, Corphyænoides, Cœlorhynchus, Hymenocephalus and Steindachneria.

GRENFELL, Bernard Pyne, English scholar: b. Birmingham, 16 Dec. 1869. He was educated at Queen's College, Oxford, becoming fellow in the University of Oxford (1894–95) and fellow of Queen's College in 1894. Since that date he has been engaged in discovering and editing of Greek papyri, and his valuable studies have won for him the degrees of Hon. Ph.D. from Königsberg, Hon. Litt.D. from Dublin, Hon.D.Jur. from Graz, and the Drexel medal from the University of Pennsylvania. Since 1916 he has been professor of papyrology at Oxford. With Hunt, he made some important discoveries at Oxyrhynchus (Behnesa) in 1896–97, and again in 1905 et seq. Among these are the 'Logia' of Jesus, fragments of Menander's 'Colax and Perinthia,' of Callimachus' 'Ætia' and Sophocles' 'Ichneutæ.' With the collaboration of Hunt he edited 'The Oxyrhynchus Papyri' (9 vols., 1897–1912); 'Menander's Georgos' (1898); 'The Amherst Papyri' (1900–01); 'The Tebtunis Papyri' (1902, 1906), excavations for the University of California; the 'Hibek Papyri' (1906); and with Hunt and Hogarth 'Fayûm Towns and their Papyri' (1900).

GRENFELL, Francis Wallace, 1st Baron of Kilvey, English soldier: b. London, 1841. He studied at Cambridge University. Enlisting in the 60th Rifles in 1859, he served in the Kaffir War (1878); the Zula War (1879); was quartermaster-general in the Transvaal (1881–82); joined the Egyptian expedition (1882); the Nile expedition (1884); the Sirdar Egyptian army (1885–92); was placed in command at Suakim (1889), and at Toski in the same year; was inspector-general of auxiliary forces (1894–97); in command of the Egyptian forces (1897–98) and was appointed governor and commander-in-chief of Malta (1899–1903). From 1903–04 he was at the head of the 4th army corps; from 1904–08 was commander-in-chief in Ireland and was made field marshal in 1908.

GRENFELL, George, English missionary and African explorer: b. Sancreed, near Penzance, England, 21 Aug. 1848; d. Basoko, Kongo Free State, 1 July 1906. He was apprenticed to a Birmingham hardware firm and there lost an eye. He was converted to Baptism at the age of 15 and in 1874 went to the Cameroons to work as a missionary under Alfred Saker. He explored the Yabrang and Sanaga rivers during the following two years. In 1877 he moved to Victoria in the Cameroons and continued his river exploration. He climbed Mt. Mongo ma Loba in 1878, and in the same year was transferred to the lower Kongo, where he co-operated with the Rev. T. J. Comber. They pushed on to the Makuta country, but the chief Ntolela forbade them to go further. In 1881 Grenfell and Comber established a chain of mission stations up to Stanley Pool on the Kongo. In 1884 he surveyed the Kongo up to 0° N. 18° E., and in the same year launched a river steam vessel, the *Peace,* with which he explored the Kwa, Kwango, Kasai, Mubangi, Ruki, Ikelemba, and Rupi. He continued his explorations the following year, and made a careful study of the Bakuba and Bakete tribes. He published his observations in the periodicals of the Royal Geographical Society, winning the founder's medal in 1887. In 1891 he was made a chevalier of the Belgian order of Leopold, and became Belgian plenipotentiary to Portugal for the settlement of the Lundo boundary question. For his services, he received the Belgian order of the Lion and the Portuguese Order of Christ. From 1893 to 1900 his headquarters was at Bolobo. By the end of 1902 he had explored the Aruwimi river. The next three years were spent at a mission station at Yalemba near the confluence of the Kongo and the Aruwimi. Toward the end of his life he was greatly dissatisfied with the Belgian administration, and made futile protests to King Leopold. Consult Dickens, 'Grenfell of the Congo' (London 1910); Hawker, 'Life of George Grenfell' (ib. 1909); Johnston, 'George Grenfell and the Congo' (London 1908).

GRENFELL, Helen Loring, American sociologist: b. Valpariso, Chile. She was graduated at the New York State Normal College at Albany, N. Y., and at the University of Denver. In 1889 she married Edwin I. Grenfell. She served for three terms as county superintendent of schools in Gilpin County, Colorado; and for the same number of terms as State superintendent of public instruction of Colorado (1899–1905). From 1909–14 she was commissioner of the State Penitentiary and Reformatory. In her government of the schools she inaugurated the system of increasing school revenues by leasing State lands for that purpose. Under her direction the school laws were revised and annotated. For 14 years she directed the work of the Colorado Equal

Suffrage Association in the capacity of vice-president.

GRENFELL, Wilfred Thomason, missionary and explorer: b. Parkgate, Cheshire, Eng., 28 Feb. 1865. He was educated at Marlborough and Oxford University, of which he is a graduate. He was house doctor for Sir Frederick Treves at the London Hospital, came to Labrador in 1892 as superintendent of the Labrador medical mission of the Royal National Mission to Deep Sea Fishermen, to which he has since devoted his life. His literary works include 'Adrift on a Pack of Ice'; 'The Harvest of the Sea'; 'Labrador: the Country and the People'; Down North on the Labrador'; 'The Adventure of Life.'

GRENOBLE, grẹ-nō'bl', France, capital of the Department of Isère, 80 miles from Lyons, a fortress of the first class, on the Isère River. The fortresses of Rabot and La Bastille are located here. The city has both an ancient and modern section, the latter possessing a fine Renaissance Palais de Justice, the cathedral of Notre Dame (12th century), an extensive library, a museum and art gallery, and the university. This last institution dates from 1339 and has faculties of law, sciences and letters. Other educational institutions are the schools of medicine, the electrical institute, artillery institute, theological schools, military, trade and art schools. Gloves are produced in great quantity, also leather dyestuffs, metal ware, silks, liquors and cement. Trade is carried on in cheese, grain and wood. Grenoble has been identified with the ancient Cularo of the Allobroges. It was captured by the Burgundians in the 5th century, and was the capital of Dauphiné until the middle of the 15th century. It is also known as the birthplace of Condillac, Stendhal, Barnave and Casinier Perier. Pop. 77,500.

GRENVILLE, George, English statesman: b. 1712; d. 13 Nov. 1770. He became treasurer of the navy in 1754, secretary of state for the northern department in 1762, and first lord of the treasury and chancellor of the exchequer in April 1763. In 1765 the Commons accepted his scheme for stamp-duties to be levied in the American colonies, which was one of the proximate causes of the American War of Independence. In 1766 he defended the stamp act in Parliament; in 1769 opposed the expulsion of Wilkes from the House of Commons, and in 1770 brought in the Controverted Elections Bill, which was passed. He was able, hard-working and honest but narrow-minded and obstinate and wanting in tact and foresight. 'The Grenville Papers,' edited by W. J. Smith (1852–53), contain interesting information on the politics of his day.

GRENVILLE, Sir Richard, English naval officer: b. about 1541; d. September 1591. In 1585 he commanded a fleet of seven vessels intended to aid in the colonization of Virginia. His most brilliant exploit occurred in 1591, when he attempted to cut his way through a Spanish fleet of 53 ships. His ship while becalmed was attacked by 15 of the largest Spanish vessels. Not till after 15 hours of battle and when only 20 out of his 150 men were left alive did he strike his colors. He died from wounds received in the engagement. It is upon this incident that Tennyson has founded his spirited ballad, 'The Revenge.'

GRENVILLE, William Wyndham, Lord: b. 25 Oct. 1759; d. Dropmore, Buckinghamshire, 12 Jan. 1834. He was the youngest son of George Grenville (q.v.). He was educated at Christ Church, Oxford, and then entered Lincoln's Inn, where he studied law. He was elected to the House of Commons in 1782 and served as secretary to his eldest brother who was Lord Lieutenant of Ireland. After occupying the post of paymaster-general of the army in 1783, he was sent by William Pitt in 1787 to Holland, where he bent his energies toward effecting the Triple Alliance of 1788. On his return to England, the House of Commons elected him as its speaker. Grenville held this office for barely a year when he accepted that of secretary of state for the home department. In 1790 he was elevated to the peerage as Baron Grenville. Under Pitt's ministry he became foreign secretary (1709–1801), resigning with Pitt on the occasion of the break over the Catholic Emanicipation Act. In the "All Talents Ministry" he became premier and was instrumental in securing the bill which abolished slave trade. He was appointed chancellor of the University of Oxford 1809. He published 'Essay on the Supposed Advantages of a Sinking Fund' (1828). Consult Adams, 'The Influence of Grenville on Pitt's Forcign Policy' (Washington 1904).

GRENVILLE ACT, 6 April 1764. An act passed by the English Parliament on the proposal of George Grenville, a member of Lord Bute's ministry. Its purpose was more effectively to protect English trade and manufactures from foreign competition, to raise better revenues from the colonies. It was based on the act of 1733, which, to protect the British West India sugar industry, laid prohibitory duties on the import of French West India sugar and molasses into the colonies, and which, if enforced, would have ruined New England's commerce. The new act made the duty on molasses a heavy revenue one instead; increased the duty on sugar, and laid new duties on wines; decreased the drawbacks on foreign articles exported to America; imposed regulations on manufacturers, and attempted to enforce the Navigation Acts more thoroughly; and prohibited all trade between the colonies and the French islands Saint Pierre and Miquelon.

GRESHAM, Sir Thomas, English financier: b. 1519; d. 1579. After studying at Gonville Hall, Cambridge, he became an apprentice to his uncle, Sir John Gresham, a merchant, where his special aptitude for business soon manifested itself. He became a member of the Mercers' Company (1543) and in 1551 was appointed king's factor at Antwerp. In this capacity he managed all financial relations with the merchants of Flanders for England, and was especially active in securing bullion for his country. His religion (Protestant) made him unacceptable in Mary's reign, but Elizabeth restored him to service. Gresham made a journey to Spain to secure bullion in 1554; was knighted in 1559 and sent as Ambassador to Netherlands. His private banking and trading enterprises made him one of the wealthiest men in the Kingdom. He established the Royal

Exchange in London. On his death, much of his money went to philanthropic foundations, and to the establishment of Gresham College. (See GRESHAM'S LAW). Consult Burgon, 'Life and Times of Sir Thomas Gresham' (London 1839).

GRESHAM, Walter Quinton, American jurist and statesman: b. near Lanesville, Harrison County, Ind., 17 March 1832; d. Washington, D. C., 28 May 1895. His family originated in Kentucky, from which State his grandfather had removed to Indiana. There his father met with success as a farmer, and also exercised the art of cabinet-making. He was elected sheriff and was murdered in the performance of his duties. The son was educated at the local school, and the State University, Bloomingdale, Ind. After leaving the latter he went to Corydon, Ind., and began the study of law, while filling the office of deputy clerk (1854). In 1860 he was elected to the State legislature. When the Civil War broke out he was commissioned in the Federal service as lieutenant-colonel of the 38th Indiana regiment. He was promoted under Grant, and at Vicksburg had charge of a brigade with the rank of brigadier-general of volunteers. He joined Sherman's forces in the expedition against Atlanta, Ga., where he commanded the 4th division of the 17th Army Corps. At Leggetts Hill, in January 1864, he was severely wounded and disabled from service, and in the following year was retired as major-general of volunteers. He chose as his home New Albany, Ind., and began an active life as law practitioner. In 1866 he was put forward by his friends as Republican candidate for Congress, but was defeated at the polls, and for the two following years resided in New York, as the financial agent of his State. His next field of activity was as a jurist, for in 1869 President Grant appointed him judge of the United States Circuit Court for Indiana. He had previously declined an appointment as collector of customs at New Orleans, which would have necessitated his removal from Indiana. He had also declined the position offered him as district attorney. But his great abilities and high character had pointed him out as fitted for some important employment, and in 1882 no surprise was felt, but rather general expectation was satisfied when he received an appointment to the cabinet with the portfolio of postmaster-general (1882). Upon his recommendation Congress passed an act excluding all lottery matter from the United States mails. In 1884 he was called to the secretaryship of the treasury, in the discharge of whose duties he would doubtless have increased his reputation as a financier, had he not been appointed a few months later as United States circuit judge for the 7th judicial district. He made himself conspicuous as favoring the third term of his old friend General Grant (1880). His own name had been put forward with some enthusiasm as presidential candidate in 1884, and again in 1888. There were many who thought that he had good claims to be invested with the office of the chief magistrate. Subsequently he changed his convictions on the most important question of the hour, and ranged himself on the side of views of tariff legislation with which the Republican party had no sympathy. The Populists, however, looked upon him with favor as his judicial decisions had in many cases been to their advantage. Had he consented, they would have nominated him for the presidency at the national convention of that party held at Omaha, Neb., in July 1892. He declined the honor and made a public statement announcing his purpose of supporting Grover Cleveland's nomination. He was afterward named by President Cleveland as Secretary of State.

GRESHAM'S LAW, a principle in finance and political economy formulated about the middle of the 16th century by Sir Thomas Gresham, founder of the London Royal Exchange. It may be thus stated and expounded. Bad money drives out good money from the circulation. The good coin of full weight and purity in circulation with worn, light or depreciated coins, will be hoarded or used for exportation, where it will buy more abroad than the worn out coins, which will be left to pass as counters at home. This law is still a living principle, and especially applicable in controverting the position of those who wish the United States, single-handed, to issue a currency of the double standard. Gresham's law only applies where there is a general tendency to export money.

GRESSET, grĕs'sä', **Jean Baptiste Louis,** French poet and dramatist: b. Amiens, 29 Aug. 1709; d. there, 16 June 1777. At an early age he entered the Jesuit ranks and was sent to the Collège Louis le Grand at Paris. He then accepted the post of instructor at a Jesuit College at Rouen, where in 1734 he published his poem, 'Vert, Vert' a most amusing tale of a parrot whose unseemly language shocks the gentle little nuns to whom it is sent. The intimate picture of the life of the convent comprises the chief interest of the poem. The story offended the Jesuits and Gresset fled to Paris, where he published several poems: 'La Chartreuse'; 'Carême impromptu'; 'Lutrin vivant' and 'Les Ombres.' The extremely worldly tone of these caused his expulsion from the order and he took up his residence in Paris. Several dramas followed: 'Édouard III,' a tragedy (1740); 'Sidnei,' a comedy (1745); 'Le Méchant,' the most popular of all, a comedy in verse. Gresset became a member of the Academy in 1748, but shortly afterward retired to Amiens where he deeply repented of his worldliness.

GRESWELL, William Henry, English Anglican clergyman and author. He was educated at Oxford and has been rector of Dodington, Somerset, from 1888. As a writer he is known by 'Our South African Empire' (1885); 'Imperial Federation' (1887); 'History of the Canadian Dominion' (1890); 'Geography of the Canadian Dominion' (1891); 'Geography of Africa South of Zambesi' (1892); 'The British Colonies and Their Industries' (1893); 'Growth and Administration of the British Colonies' (1897); 'The Land of Quantock' (1903); 'The Forests and Deerparks of Somerset' (1905); 'Chapters on Glastonbury Abbey' (1909).

GRETCH, Nikolai Ivanovitch, Russian author: b. Saint Petersburg, 1787; d. 1867. He was of a Bohemian family, and was sent to study of law. His natural proclivities, however, led him to undertake the study of literature, and he became professor of Russian literature at the School of Saint Peter (1809–13), and again at a gymnasium. He then entered politics in the department of the interior and later in the department of finance. In connection with this work he toured the continent. In 1812 he became editor of *Syn Otečestva,* a conservative paper, and in 1825 associate editor of the *Sĕvernaia Pčela.* His books comprise a handbook of Russian literature (1819–22), a Russian grammar (2d ed., 1830); two novels, two books of travel and memoirs (1886). His complete works were published at Saint Petersburg 1855. Consult Waliszewski, K., 'History of Russian Literature' (New York 1900).

GRETNA, La., town, capital of Jefferson Parish; on the Mississippi River and the Southern Pacific railroad and other lines; opposite New Orleans. A number of the Mississippi River packet lines take on and discharge shipments at Gretna. It was founded in 1835, and has many of the advantages of a suburb of New Orleans. It manufactures cottonsed oil fertilizers and soap and its trade is chiefly in cottonseed oil. Pop. about 7,000.

GRETNA GREEN, or **GRAITNEY,** Scotland, village in Dumfriesshire, on the Solway Frith, eight miles north of Carlisle. After the abolition of the Fleet marriages under Hardwicke's Act in 1754, Gretna became notorious as the place of celebration of the marriages of runaway couples from England. In England publication of banns and the presence of a priest at the ceremony were necessary, but to conclude a lawful marriage in Scotland it was then only necessary for an unmarried couple to go before witnesses and declare themselves man and wife. The Anglican marriage service was usually read at these marriages by a pseudo-priest, said to be the blacksmith of the village, who has become in consequence a historical character in fiction. As many as 200 irregular marriages have been thus contracted in a twelvemonth. Gretna Green marriages are now at an end, in consequence of a statute which enacts that no irregular marriage contracted in Scotland shall be valid, unless one of the parties resides in Scotland, or has done so for 21 days next preceding such marriage. Pop. of parish 1,212.

GRÉTRY, grā'trē', **André Ernest Modeste,** French composer: b. Liège, 8 Feb. 1741; d. Ermenonville, 24 Sept. 1813. After completing his studies at Rome he settled at Paris and there his reputation was made. He was the most prolific composer of his age. He produced forty comic operas, most of which with the exception perhaps of 'Raoul' and 'Richard Cœur de Lion' are now forgotten. His 'Memoiries' 1796, and his life by Gregoir and Brenet give the main incidents of his career.

GREUZE, grez, **Jean Baptiste,** French painter: b. Tournus, Burgundy, 21 Aug. 1725; d. Paris, 4 March 1805. He studied painting at Lyons and Paris and attracted notice by his earliest pictures, 'A Father Explaining the Bible to His Children' and 'The Blind Man Cheated' and in 1755 was admitted by the academy. He visited Rome, and desiring to rank as a historical painter, chose classical subjects, in which he failed, and ultimately returned to his former style of genre, 'The Girl Crying over Her Dead Bird'; 'The Good Mother'; 'The Bad Boy Punished,' and the like. He died in great poverty due to his own improvidence. He was a fine colorist, but great success was due mainly to his choice of subjects. At the Pourtalis sale of 1865, his 'La jeune fille à l'agneau' was sold for 1,000,200 francs ($200,000). He represented a reaction against the artificiality of the age, and a return to nature, though he himself was still hampered by the spirit of his century. The Metropolitan Museum, New York, contains his 'Girl Winding Wool.' Consult Dilke, 'French Painters of the Eighteenth Century' (London 1899); Normand, 'Jean Baptiste Greuze' (Paris 1892); Rivers, 'Greuze and his Models' (London 1912).

GREVILLE, Charles Cavendish Fulke, English diarist: b. 2 April 1794; d. 18 Jan. 1865. He was educated at Eton and Christ Church, Oxford, but left before he completed his course in order to become a private secretary to Earl Bathurst. He was next appointed to the sinecure office of Secretary of Jamaica, and in 1821 became clerk of the council, a post which he held for 40 years. His period of service extended through the reigns of three sovereigns. The experiences with which he met are recorded with great insight and care in his 'Diary.' This book was entrusted to his friend Henry Reeve with the request that it be published after Greville's death; and accordingly three volumes covering the reigns of George IV and William IV appeared in 1875. The record is a faithful account of political causes and has proved of invaluable worth in the study of the century. The volumes covering the early reign of Victoria were published at a later date. Greville was also the author of an anonymous work on the 'Past and Present Policy of England and Ireland' advocating the payment of the Roman Catholic clergy (1845). His diaries have been collected under the title 'Greville Memoirs: Journal of the Reigns of George IV, William IV and Queen Victoria' (8 vols., London 1896). There is a biographical sketch in the preface to the first edition by Henry Reeve..

GREVILLE, Sir Fulke, 1st Lord Brooke, English poet and courtier: b. Beauchamp Court, Warwickshire, 1554; d. 1628. He studied at Jesus College, Cambridge, and then went to the court of Elizabeth in 1597. Sir Philip Sidney whose friendship with Greville began in their early school days at Shrewsbury, entered the court at the same time. Greville toured the continent where he was well received and then took service with Henry IV in Normandy. He sat in Parliament during four sessions between 1592–1620; was treasurer of the navy (1598); became Life-secretary for Wales (1603). In 1621 he was elevated to the peerage as Baron Brooke. Most of his literary work was published posthumously. His poems include 'The Tragedie of Mustapha' (1609); 'A Treatie of Humane Learning'; 'An Inquisition upon Fame and Honour'; 'A Treatie of Warres'; 'The Tragedie of Alaham' and 'Cœlica,' all of which were published in 1633. His best-known work is his 'The Life of the Renowned Sir Philip Sidney' (1652; reprint Oxford 1907). His collected works were edited by Grosart in the 'Fuller Worthies Library' (1870).

GREVILLE, Henry. See Durand, Alice Mary.

GREVY, grā'vē', **François Paul Jules**, French statesman: b. Mount-sous-Vaudrey, Jura, 15 Aug. 1807; d. 9 Sept. 1891. He studied law in Paris, and became prominent as the defender of republican political prisoners. In 1848 he was returned to the Constituent Assembly, where his ability as a speaker soon made him distinguished. After the *coup d'état* he retired from politics, but in 1869 again entered the Assembly as deputy for the Jura. In February 1871 he was elected president of the National Assembly, and re-elected in 1876, 1877 and 1879. When Marshal MacMahon resigned in 1879 Grevy was elected president of the republic for seven years. In December 1885 he was elected president for a second term of seven years, but, hampered by ministerial complications, resigned in December 1887.

GREW, Nehemiah, English physician and botanist: b. Mancetter Parish 1641; d. 1712. He studied at Cambridge University and received his M.D. from Leyden in 1671. He was elected secretary of the Royal Society in 1677. His principal work has been in the study of the anatomy and physiology of plants and vegetables. Among his works are ‘The Anatomy of Vegetables Begun, with a General Account of Vegetation Grounded Thereon’ (1672); ‘The Comparative Anatomy of Trunks’ (1675); ‘A Discourse of the Colors of Plants’ (1677); ‘Cosmologia Sacra, or a Discourse of the Universe’ (1701). He was also editor of ‘Philosophical Transactions’ (1678–79), and wrote some minor papers on human anatomy and the uses of salts found in waters. A genus of trees was named in his honor *Grewia*.

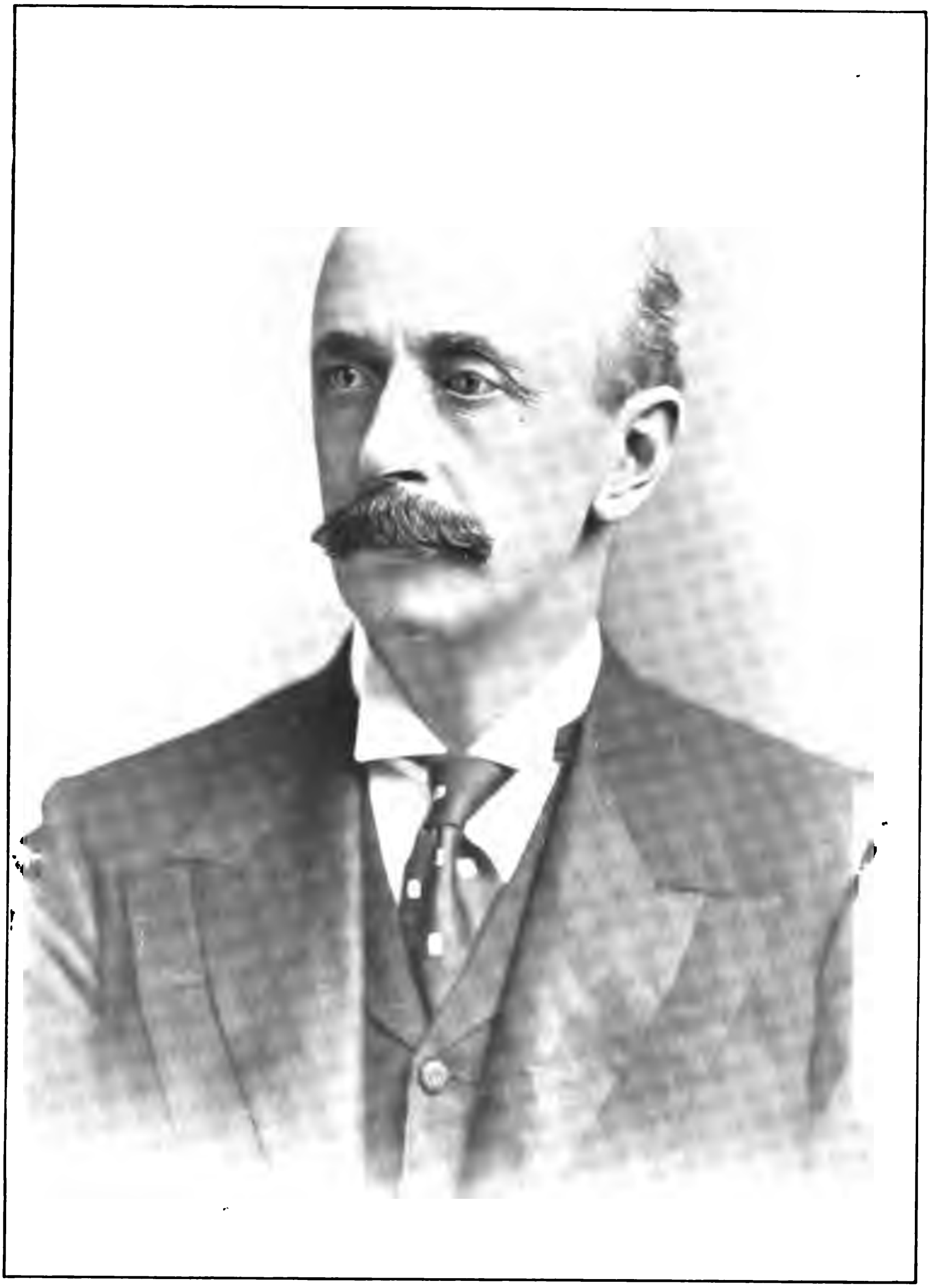
GREY, Albert Henry George, 4th Earl, English statesman: b. Howick, Northumberland, England, 28 Nov. 1851. His grandfather, the second earl, was prime minister of England, and influential in securing the passage of the Reform Bill of 1832. The present earl was graduated from Trinity College, Cambridge; in 1880 he was elected to Parliament as a Liberal, and supported Gladstone in the House until 1886 when the Liberals declared in favor of home rule. He then became a Liberal Unionist, but lost his seat in Parliament. In 1894, as his uncle died childless, he succeeded to the estate and title. He was a personal friend of Cecil Rhodes, was one of the promoters of the British South Africa Company, and in 1896–97 served as administrator of Rhodesia. As an executor of the Rhodes will, he is now one of the trustees of the scholarship fund. He has been an active worker in reform movements, especially in the cause of co-operation and of temperance. On his estate he has organized a co-operative system which has worked successfully; and in 1901 he organized a system for the management of public houses in the interests of the public, known as the Public House Trust. From 1904–11 he was governor-general of Canada.

GREY, Charles, 1st Earl Grey, English general: b. Howick 1729; d. 1807. In 1748 he became an ensign in the English army, and was aide-de-camp to Ferdinand of Brunswick during the Seven Years' War. He served in America during the Revolution and became major-general in Howe's army 1778. In 1782 he was appointed lieutenant-general and given charge of the British army in America. In 1793 he led an expedition against the revolted West Indies. He commanded the southern district against the threatened invasion of Napoleon, and after the peace of Amiens was elevated to the peerage as Baron Grey of Alnwick; in 1806 becoming Earl Grey and Baron Howick.

GREY, Sir Edward. See Grey of Fallodon, Viscount.

GREY, Sir George, British colonial governor and statesman: b. Lisbon, 14 April 1812; d. London, 20 Sept. 1898. He was the son of Lieutenant-Colonel Grey of the 30th Foot Guards. After receiving his training at Sandhurst Military College, he was commissioned in 1829, becoming lieutenant in 1833 and captain in 1839. In 1836 he undertook the exploration of northwest Australia for the Royal Geographical Society, and in the following year traveled over the Swan River district. Two years later he was appointed governor-resident at Albany; and after a short service in that capacity, returned to London. He was immediately detailed to South Australia as governor. His vigorous rule restored peace and prosperity to the region and autonomy followed. After eight years of governorship, Grey was knighted and transferred to Cape Colony. Here his administration was characterized by the same firm policies and the same independent interpretation of the interests of the colonists. His attempts to federate South Africa displeased the Colonial Office and he was sent back again to New Zealand, a post of increased difficulties and hardships. In 1867 he was recalled to England, where his attempts to enter politics met with little success. A pension of £1,000 was awarded him five years later on which he retired near Auckland with the intention of withdrawing from politics altogether and devoting himself to scholarly pursuits. But in 1875 he was invited to accept the office of superintendent of the province of Auckland; sat later in the New Zealand House of Representatives and rose to the premiership. His ministry ended in 1879; and his advocacy of the reform franchise at the Sydney convention was his last active work in the politics of the country whose interests had absorbed the best energies and efforts of his life. In 1894 he returned to London where until his death he enjoyed some small degree of royal favor. His extensive library was donated partly to Cape Town and partly to Auckland. A statue has been erected to his memory at Cape Town. He wrote ‘Journals of Discovery in Australia’ (1841); ‘Polynesian Mythology’ (1855); ‘Proverbial Sayings of the Ancestors of the New Zealand Race’ (1858). Consult Rees, W. L. and L., ‘The Life and Times of Sir George Grey’ (London 1892); Henderson, G. C., ‘Sir George Grey’ (ib. 1907); Collier, T., ‘Sir George Grey’ (1909).

GREY, Henry George, 3d Earl. English statesman: b. Howick, Northumberland, 28 Dec. 1802; d. 9 Oct. 1894. He was educated at the University of Cambridge and after 1807 was known as Viscount Howick. He was elected to Parliament in 1826 as a Whig, sitting for Northumberland after 1831. In 1830 he



ALBERT HENRY GEORGE, THE FOURTH EARL GREY

became undersecretary for the colonies in his father's Cabinet. He was one of the leaders of the colonial reformers and in 1834 resigned because slave emancipation was made gradual instead of immediate in the British West India colonies. When the Melbourne ministry came into power in 1835 he was given the portfolio of Secretary of War. He inaugurated several administrative reforms, particularly in connection with the Indian troops. He resigned his Cabinet post in 1839, because of dissatisfaction with the views of his colleagues on colonial questions. About 1841 he became a pronounced advocate of a free trade policy and his speeches and writings on this question did much to bring the Whigs to accept his policy. Becoming third Earl Grey in 1845 he took his seat in the Lords that year, and soon became Whig leader there. Lord John Russell offered Grey a Cabinet post in 1845 but the latter objected to Palmerston as a colleague. Within a few months, however, he became colonial secretary in a Cabinet which included Lord Palmerston. His colonial administration was most progressive; he first recognized the right of the colonies to be governed for their own benefit rather than in the interest of the home land; to this end he granted them large measures of self-government, and introduced free trade measures between them and Great Britain and Ireland. Other projects of his in the colonies were less successful and in 1852 he resigned with his colleagues. After this he never held office, but he closely followed all public questions and was a vigilant critic of the measures of both great parties. He opposed Gladstone's Home Rule policy. His published works include ‹The Colonial Policy of Lord John Russell's Administration› (2 vols., 1853); ‹Parliamentary Government› (1858); ‹Free Trade with France› (1881); ‹Ireland: The Causes of its Present Position› (1888); ‹The Commercial Policy of British Colonies and the McKinley Tariff› (1892). He edited ‹Correspondence of Charles, Second Earl Grey with William IV› (1867).

GREY, Lady Jane, English princess: b. Bradgate, Leicestershire, 1537; d. Tower Hill, London, 12 Feb. 1554. She was the daughter of Henry Grey, marquis of Dorset, afterwards duke of Suffolk. She displayed much precocity of talent, and possessed an acquaintance with the classic and oriental tongues, as well as French and Italian. She was married to Lord Guildford Dudley, fourth son of the Duke of Northumberland, in May 1553. Edward VI was induced at his death, 6 July 1553, to settle on her the succession to the Crown. The council endeavored to keep his death secret with a view to securing the persons of the princesses Mary and Elizabeth. Mary was appraised of their design and wrote expressing her surprise that she had not been advised of her brother's death, and commanded them on their allegiance to proclaim her title. The council replied exhorting her to be quiet and obedient, and proclaimed Lady Jane on the 10th. On the approach of Mary the Council, unsupported in their usurpation, meanly deserted their victim Lady Jane and joined in proclaiming Mary queen on the 19th; the 20th Lady Jane was confined to the Tower. On 14 November she and her husband were arraigned and pleaded guilty of high treason, and they might have been permitted to expiate their imprudence by a temporary confinement but for the ill-advised insurrection under Sir Thomas Wyatt, in which the Duke of Suffolk, Lady Jane's father, participated. The suppression of this rebellion was followed by their execution.

GREY OF FALLODON, 1st Viscount, better known as Sir Edward Grey; English statesman: b. London, 25 April 1862. His father, Colonel George H. Grey (d. 1874) served in the Crimea and in the Indian mutiny; his mother was the daughter of Lieut.-Col. Charles Pearson and his grandfather the well-known statesman Sir George Grey, a nephew of Earl Grey, the great Whig leader and reformer. On the death of his grandfather he succeeded to the baronetcy and became «Sir Edward.» Three years later he was elected Liberal M.P. for Berwick-on-Tweed, which constituency he represented for 31 years, till his elevation to the peerage in 1916. When Gladstone became Premier for the fourth and last time in 1892, he appointed Sir Edward under-Secretary for Foreign Affairs. Lord Rosebery was the Foreign Secretary, and as by virtue of his title he necessarily sat in the House of Lords, it fell to the under-secretary to represent the foreign office in the Commons — a delicate and responsible task. During the short-lived Rosebery administration (1894–95), Sir Edward continued in his post under Lord Kimberley. The foreign policy pursued by Lord Rosebery marked a profound change in British political history. Hitherto there had been two distinctly different policies, according to whether the Conservatives or the Liberals were in power — that of the former being invariably energetic and strong; of the latter, vacillating and unreliable. Lord Rosebery had twice succeeded Lord Salisbury as Foreign Secretary (1886 and 1892); and on each occasion continued the policy of his conservative predecessor. Thus it may be said that Sir Edward Grey studied diplomacy under these two excellent masters, diametrically opposed on perhaps every question of the day excepting only that of British relations with other countries. After the resignation of the Rosebery Cabinet in 1895 the Liberals «wandered in the wilderness» for 10 years until the resignation of Mr. Balfour in December 1905, when Sir Edward Grey became Secretary of State for Foreign Affairs in the Campbell-Bannerman administration. Long regarded as a man of «infinite possibilities in the future» by his colleagues, his accession was marked by no little curiosity and speculation in the chancelleries of Europe. The government was certainly «Liberal» in the widest sense of the word — even radical, socialistic, revolutionary. By far the bulk of the government's overwhelming majority was of the «little Englander» or anti-imperialist type, imbued with «millennium» theories born of the Tsar's peace proposals of 1898. Reduction in naval and military expenditure was an important item in their program. The extreme section, indeed, favored gradual disarmament, since democracy was now supposed to be firmly established in the world and the Russo-Japanese War was regarded as the last conflict among the great nations. The vision of the new Utopia had hypnotized not only the rank and file, but almost the entire Cabinet, with two notable exceptions: Mr. Asquith, then Chancellor of the Exchequer and

Sir Edward Grey. They were regarded by the conservative element of British opinion as the stabilizing forces of the government. Neither was a dreamer nor an idealist; each was practical and businesslike.

Sir Edward Grey took up the threads of British foreign policy at an epochal moment. The policy of «splendid isolation» was dead; from his predecessor, Lord Lansdowne, he inherited the Anglo-Japanese Alliance and the «Entente Cordiale» with France, which latter he strengthened by concluding the Anglo-Russian agreement (31 Aug. 1907), thus completing that triple bond to which German opinion sought to ascribe the origin of the European War. The German Emperor's pilgrimage to Tangier in 1905 had already raised the spectre of war; the subsequent conference at Algeciras and the Agadir incident were generally recognized as German attempts to break up the coalition. Certain elements in the British Cabinet were suspected of «truckling» to Germany at the expense of France; Sir Edward, happily, stood firm and impervious to the promptings of his colleagues and the radical press. It is to his credit also that he aimed at securing an American alliance by means of an unlimited arbitration treaty, but failed. His statesmanship during the Balkan Wars (1912–13) contributed in large measure to avert a general European conflagration; he handled the delicate negotiations with tact and strength.

During the first seven years of Sir Edward's tenure of the Foreign Office it was perhaps unfortunate that Germany was represented in London by Count Metternich, a diplomat of the subtle calibre of the greater Metternich and Talleyrand, with a strong tincture of Bismarck. It was inevitable that the direct and simple manner of the British Minister should have been misunderstood by a mind of a totally different texture; that transparent sincerity and plain words were regarded as nothing but a cunning disguise. In 1912 Count Metternich was transferred to Constantinople, changing places with Baron Marshall von Bieberstein, who died almost before he had begun his work in London. He was followed by Prince Lichnowsky, a cultured diplomat almost English in manner and frankness of purpose. Subsequent events proved, however, that he was not in the confidence of his own government. It seemed at the time England and Germany were successfully co-operating during the Balkan Wars, that the danger-point between the two nations had passed, and Sir Edward Grey was clearly moving with strong hope towards an understanding with Germany. That his efforts were directed toward the impossible has been amply testified by the torrent of literature which the diplomatic history of Europe has produced since 1899. One of the most instructive works on the subject, 'Problems of Power,' by W. Morton Fullerton, was published in 1912, and reveals a remarkably «intelligent anticipation of events before they happen.»

Throughout the course of the grave period immediately preceding the war Sir Edward Grey strove more earnestly than perhaps any other man in Europe to preserve peace. When he handed the seal of his office over to Mr. Balfour in December 1916, he was the last of all the European ante-bellum foreign ministers to pass from the stage. King George had conferred an earldom upon him in recognition of his 11 years' service at the Foreign Office, but Sir Edward requested that the honor be reduced to a viscountship. Not the least of his services to the empire was the remarkable innovation he introduced at the Imperial Conference in 1911, on which occasion he addressed the assembled Colonial representatives with a detailed account of the situation in foreign affairs. This step had a far-reaching effect; the mother country had called a family council that drew closer the ties of kindred and common interests. A competent English observer described Sir Edward as being «wholly insular in his tastes, almost unknown in society, much more devoted to fishing than to politics,» and that «the transparent honesty of his aims, his entire freedom from artifice . . . give him a certain isolation and authority that are unique.» See War, European — Introduction and Diplomatic History; Morocco; Persia.

GREY FRIARS, a name given some of the Franciscans on account of their grey habits.

GREYHOUND, a long, tall, slender hound, the standard features of which are described under Dog. It hunts by sight, is fitted for the swiftest running and leaping, and is used in the sport of coursing (q.v.). In the United States greyhounds are kept mainly as pets; yet in the West are used in chase of jack-rabbits, prong-horn antelopes and coyotes. Few horses are able to keep up with them, even in a level country, and on an irregular surface they distance horses easily. The modern thin, smooth-haired type, to which the name is now popularly restricted, is a development from a form which arose in western Asia before the Christian era, and was adopted and esteemed in Syria, Egypt and Rome, during the classic period. It was taken west with the Romans in their conquest of Europe, and later became the favorite dog of the nobility, an accompaniment of falconry. At that time black, or black-and-white were the approved colors. There seems to have been little essential change of form or qualities during this prolonged history, and literature and art abound in commemoration of the dog's grace, kindliness and exploits in the field. There arose at an early time a diminutive variety not half the size of its namesake (about 7 pounds in weight) fragile, delicate, and of no use save as an ornamental pet, which is now known as the Italian greyhound. It is of almost any whole color — black, mouse-grey, fawn or rarely white. Besides these satin-coated «long-dogs,» others arose in the colder parts of Europe which differed from the greyhound only in having a «rough,» that is long-haired, coat. These are the Irish wolfhounds (see Wolfhound), the Scotch stag or deerhound, and the Russian wolfhound or psovie (see Borzoi).

GREYLOCK, Mount, Mass., the highest point in the State. It is situated in Berkshire County, five miles southwest of North Adams. It reaches a height of 3,505 feet. The State has purchased 14,000 acres on the upper part of the mountain for a park reservation.

GREYMOUTH, New Zealand, seaport town of South Islands in Grey County at the mouth of Grey River. It is 100 miles northwest of Christchurch and 190 miles southwest of Nelson. It carries on a considerable trade in coal and gold for the mines of the district. There are also saw mills and brick yards. Pop. 5,500.

GREYSON, grā'zôn', **Emile**, Belgian educator and author: d. Brussells, 1892. His principal works are 'Fiamma Colonna' (1857); 'Les récits d'un Flamand' (1859); 'Sites ardennais' (1860–62); 'Les magots de Téiers' (1863); 'Aventures en Flandre' (1882); 'Entre bourgeois' (1883); 'Les aberrations de Maxime sur l'éducation' (1888); 'Hier — aujourd'hiu' (1890). He was appointed director of higher and intermediate instruction and contributed many papers on the subject of education to the *Revue de l'Intruction Publique.*

GREYTOWN, old name SAN JUAN DE NICARAGUA, destroyed in 1854 by the United States. (For the general situation, see CLAYTON-BULWER TREATY). In May 1854 the captain of an American steamship had a quarrel with a negro, and shot him dead; the mayor of the city ordered him arrested, and the passengers on the ship, as well as Solon Borland, the United States Minister to Nicaragua, took the captain's part and resisted the arrest. The native inhabitants were indigant and mobbed Borland, whereupon the United States war-vessel Cyane, Commander Hollins, was sent to exact reparation. Hollins espoused the cause of an American transit company who were making excessive claims, and ordered the mayor to pay them at once; on their refusal he bombarded and burnt the place. This outrage embroiled the United States with Great Britain.

GREYWACKE. See GRAYWACKE.

GRIBBEL, John C., American manufacturer: b. Hudson City, N. J., 29 March 1858. He was educated at the college of the city of New York, and for some years was connected with the Importers and Traders' National Bank and the Leather Manufacturers' National Bank in Philadelphia. In 1883–90 he was the New York agent of Harris, Griffin and Company, manufacturers of gas meters. In the latter year he was admitted to partnership in John J. Griffin and Company and has been proprietor of the business under this name since 1892. In 1913 he became joint owner of the Philadelphia *Public Ledger.* He is on the executive board of several public service corporations and banks, and is president of the Union League Club of Philadelphia. He has made a valuable collection of American Colonial historical documents and autograph letters, English and French engravings of the 17th and 18th centuries, and rare books of the 15th, 16th, 17th and 18th centuries.

GRIBBLE, a small boring isopod (*Limnoria lignorum*) common on the sea coasts. It is very common in California, and there as elsewhere it does extensive damage to piers and wharves by boring into the submerged wood, on which it feeds.

GRIBEAUVAL, grē'bō'väl', **Jean Baptiste Vaquette de**, French military engineer: b. Amiens, 1715; d. 1789. He became a member of the Royal artillery in 1732; an officer in the engineer corps (1735), and captain (1752). He served with Austria in the Seven Years' War, in which he rendered distinguished services at the seige of Glatz and the defense of Schweidnitz. Taken prisoner, he was released and raised to the rank of lieutenant field marshal. On returning to France his chief efforts were occupied with the standardization of artillery weapons and the reform of artillery tactics which added so much to the success of Napoleon.

GRIBOYEDOV, grē"bō-yĕd'ŏf, **Alexander Sergyeevich**, Russian dramatic writer: b. Moscow, 4 Jan. 1795; d. 30 Jan. 1829. In his parental home he studied music and modern languages. He also was very fond of reading comedies. At the age of 15 he went to the university, accompanied by a tutor whose duty it was to prevent his association with persons of low rank. He studied law but was allowed to frequent also all other faculties where distinguished professors were lecturing. He had the good fortune in making friendship with Professor Bule who took a deep interest in him, broadened his horizon and, above all things, developed in him a strong love for dramatic poetry. He read Plautus, Terence and other Latin comic writers and finished with Molière and the later comical writers of France. In 1816 he was attached to the Ministry of Foreign Affairs and thus made excellent connections in Saint Petersburg society. After having made a translation from French and other literatures he wrote a comedy, 'The Student' in which he derided, not without extravagant caricature, the affectations of sentimentality and romanticism. In his 'Gorya ot uma' ('Woes of Wit') he shows remarkable astuteness, liveliness, facility in versification and energetic dialogue. He was just beginning another comedy when he accepted the post of second in the duel between Sheremetev and Zaradovski on account of which he almost lost his diplomatic position. The misunderstandings grew worse and he himself was on the point of fighting in a fresh duel when his mother used all her influence with the Secretary of State for Foreign Affairs and caused her son's transfer as secretary of the Imperial Embassy to Teheran. In Persia he studied the Arabian and Persian languages as also the dramatic works written in those languages. In 1821 he was sent to Tiflis to report on the war that had broken out between Persia and Turkey and on his way to that city he fractured his arm. This accident was the cause of his immediate transfer to the Foreign office at Saint Petersburg. During that time he wrote only insignificant verses and lost confidence in his dramatic ability. In 1828 he was appointed resident minister to the Persian Court. There he met his old friend Prince Chavchevaze whose daughter he married. On 30 Jan. 1829 a mob of about 100,000 Persians, headed by Griboyedov's personal enemy Alayar-Khan, attacked the Russian legation. Griboyedov fell mortally wounded while defending the embassy entrance against the fanatics.

GRIDLEY, Charles Vernon, American naval officer: b. Logansport, Ind., 24 Nov. 1845; d. Kobe, Japan, 5 June 1898. A graduate (1863) of the United States Naval Academy, he served during the Civil War in the West Gulf blockading squadron, subsequent to the war was on various ships, and in 1875–79 was stationed at the Naval Academy. He was navigation officer in the Boston Navy Yard in 1882–84, was lighthouse inspector in 1887–91 and 1895–97, in

1897 attained the rank of captain and was appointed to the command of the Olympia, then flagship of the Asiatic squadron. This vessel he commanded in the battle of Manila Bay 1 May 1898.

GRIDLEY, Richard, American soldier: b. Boston, Mass., 3 Jan. 1711; d. Stoughton, Mass., 20 June 1796. He served in the British army as lieutenant-colonel of engineers under Pepperell at the capture of Louisburg in 1745; as chief engineer and colonel of infantry in 1755; took part in the expedition to Crown Point under Winslow in 1756; under Amherst in 1758; and under Wolfe at Quebec in 1759. He was appointed chief engineer and commander of the artillery of the American army upon the outbreak of the Revolution, constructed the fortifications on Breed's Hill before the battle of Bunker Hill, and later fortified Dorchester Heights. He was commissioned major-general by Congress on 20 Sept. 1775, and commanded the Continental artillery till November of that year.

GRIEG, grĕg, **Edvard,** Norwegian composer: b. Bergen, 15 June 1843; d. there, 4 Sept. 1907. His great-grandfather, Alexander Greig, was a Scotchman who emigrated to Norway after the battle of Culloden (1745) and changed his name to Grieg. Edvard's father was British consul at Bergen; he married the Norwegian Gesine Judith Hagerup, a descendant of Kjeld Stub; from her, Edvard inherited his musical gifts; she was a good musician and gave him lessons. By the advice of Ole Bull, Edvard was sent to the Leipzig Conservatory at the age of 15; he remained there three years, studying with Plaidy, Wenzel, Moscheles, E. F. Richter, Hauptmann, Reinecke. Their lessons, and the music he for the most part heard and studied, impressed a German stamp on his mind, which characterizes his first compositions. His studies were interrupted by an illness, a severe case of pleurisy, which destroyed one of his lungs and left his health impaired for life. On his return to the North he came under the influence of three Scandinavian musicians: the composer Gade, who gave him many useful hints; Ole Bull, an ardent musical patriot, who made him familiar with the charming folk-tunes of Norway, which he played so entrancingly; and Richard Nordraak, who encouraged him in his natural inclination to get out of the maelstrom of German music and steer into the fjords of Norway. From 1866 to 1873 he lived at Christiania, conducting the Philharmonic concerts and giving lessons. He also gave subscription concerts, with the aid of his cousin, Nina Hagerup, whom he married on 11 June 1867; she was an excellent vocalist, whose art was a great aid in winning favor for his songs. In 1868 Liszt accidentally came across Grieg's first violin sonata (Op. 8), and was so much impressed by the evidence of creative power it gave that he invited him to come and spend some time in his studio. It was in consequence of this flattering letter that the Norwegian government gave Grieg a sum of money which enabled him to visit Rome. There he repeatedly met Liszt, who became more and more impressed by the boldness and the national traits of his genius; he urged him to perserve in his original course and not to let critics intimidate him.

In 1874 Henrik Ibsen asked Grieg to write the music for a stage version of his ‘Peer Gynt.’ The offer was accepted and the play was produced, with much success, in 1876. It is often given in Scandinavian cities; elsewhere it has not succeeded because of its untheatrical, fantastic character and its grotesque local coloring; but the music, arranged for the concert hall in the form of two suites, soon made Grieg one of the most popular composers in all countries. In the same year that Ibsen invited him to compose the music for ‘Peer Gynt,’ the Norwegian government honored him with an annuity of 1,600 crowns for life. This relieved him of the drudgery of teaching and enabled him to devote most of his time to composing. For several years he lived at Lofthus, on the Hardanger Fjord. At Bergen, 1880–82, he conducted a musical society called the ‘Harmonien.’ In 1885 he built the elegant villa Troldhaugen, overlooking the fjord, about eight kilometers from Bergen; there he lived till his death. After his fame was well established, about 1880, he left his home frequently for concert tours in Germany, France and England. Everywhere he was acclaimed as one of the most individual and enchanting of pianists (he played only his own pieces), and usually all the seats for his concerts were sold long before their dates. Sometimes he conducted his orchestral compositions. “How he managed to inspire the band as he did and get such nervous thrilling bursts and such charming sentiment out of them I don't know,” wrote Sir George Grove in 1888. In 1893 a writer in the Paris Figaro said: “Among the most famous living musicians there is none I know of whose popularity equals, with us, that of M. Grieg.” In 1899, Colonne invited him to Paris to conduct a Grieg concert; but it was just after the verdict in the Dreyfus case, which had made Grieg so indignant that he refused the invitation. When it was repeated four years later, he accepted. There was a tremendous crowd; cries of “apologize, you have insulted France!” were heard; but the vast majority was with him, and the concert proved one of his biggest triumphs.

Grieg did for Norway what Chopin did for Poland, Liszt for Hungary, Dvořák for Bohemia; he created a new national art. This great achievement, unfortunately, stood in the way of the full recognition of his superlative genius. It is still commonly assumed that he did little more than transplant to his garden the wild flowers of Norwegian folk-music, whereas, in truth, ninety-five hundredths of his music is absolutely his own. He ranks with Schubert and Chopin both as a melodist and a harmonist. His persistent ill-health prevented him from writing operas and symphonies; most of his works are songs and short pianoforte pieces. The songs, 125 in number, are of striking originality and depth of feeling. The equally numerous short pieces for piano (including 66 “lyric pieces” in one vol.) are as idiomatic as Chopin's. There are also five sonatas: one for piano alone, three with violin, one with 'cello, beside a string quartete. The orchestral list includes: Overture, ‘In the Autumn’; ‘Holberg’ suite; two ‘Peer Gynt’ suites; ‘Sigurd Jorsalfar’; arrangements of Grieg songs and Norwegian dances. Choral works: ‘At the Cloister Gate’; ‘Landsighting’;

'Olaf Trygvason.' 'Bergliot' is a poem for declamation, with orchestra. The only books on Grieg and his works are by Schjelderup, in Norwegian, and by the author of this article, in English. The latter contains a list of pamphlets and magazine articles on Grieg.

Henry T. Finck,
Musical Critic, New York Evening Post.

GRIEPENKERL, gre'pen-kerl, **Christian,** German painter: b. Oldenburg, 1839. He studied at Vienna under Rahl with whom he was closely connected in his work. He assisted him in the paintings at the Opera House at Vienna and completed several works left unfinished at the death of Rahl. 'Œdipus Led by Antigone' was his first independent work. Others are the decorations in the Houses of Parliament; the designs of the frescoes at the Academy of Science at Athens and some portraits. He became professor at the Vienna Academy in 1874.

GRIER, grēr, **William Nicholson,** American soldier: b. Pennsylvania, 1812; d. 1885. He was graduated at West Point (1835), and after service in the Indian campaigns in the west and in the Mexican War, received the rank of major-general. In the Civil War he rose to the lieutenant-colonelcy of the First Cavalry (1862), and was brevetted brigadier-general in 1865. He became colonel of the Third Cavalry in 1866 and retired in 1870.

GRIERSON, grēr'son, **Benjamin Henry,** American soldier: b. Pittsburgh, Pa., 1826; d. 1911. He was major in the Sixth Illinois Cavalry, became colonel in 1863. His raid from La Grange, Tenn., to Baton Rouge was one of the spectacular feats of that year. The rank of major-general of volunteers was conferred on him in 1865 and in the following year he became colonel of the Tenth United States Cavalry in the Southwest. In 1867 he was brevetted major-general and also brigadier-general, with which rank he retired in 1890.

GRIERSON, Sir **George Abraham,** Irish Oriental scholar: b. Glengeary County, 7 Jan. 1851. He received his education at Trinity College, Dublin, and took advanced degrees from Dublin University, Halle and Calcutta University. In 1873 he became a member of the Indian Civil Service and rendered important service to that country. From 1898 to 1902 he was in charge of the linguistic survey of India (published in 9 vols., 1903–08). His publications include 'Handbook of the Kaithi Character'; 'Grammar and Chrestomathy of the Maithili Language'; 'Seven Grammars of the Bihar Dialects'; 'Bihar Peasant Life'; 'The Modern Vernacular Literature of Hindustan'; 'The Satsaiya of Bihari'; 'Essays on the Kashmiri Grammar'; 'The Pisaca Languages of Northwestern India'.

GRIERSON, Sir **Robert,** Scottish laird: b. about 1655; d. 1733. For his effective persecutions of the Covenanters he was appointed justice at the military court at Kirkcudbright (1681). James II elevated him to the peerage as baronet and pensioned him. The fall of his patron rendered him unpopular and he was arrested many times. He is the supposed prototype of Sir Robert Redgauntlet in Scott's 'Redgauntlet.'

GRIESBACH, Johann Jakob, a noted German New Testament scholar, biblical critic and theologian: b. Butzbach in Hesse-Darmstadt, 4 Jan. 1745; d. Jena, 24 March 1812. He was educated at Frankfort-on-the-Main; later studied theology at Tübingen, Halle and Leipzig; during 1769–70 traveled extensively in England, France and Holland; in 1771 became docent and in 1773 professor extraordinary in theology at Halle; and from 1775 till his death was professor ordinary at Jena. Griesbach's most important work — to which he devoted the best years of his life — was the collecting and classifying of the ancient manuscripts and versions of the Greek text of the New Testament. His critical researches, the result of which appeared in his edition of the Greek New Testament (Halle, 1775–77) one of the first ever printed, are valuable and in the main correct. It was he who first divided the authorities for the text of the Greek New Testament into the three great families — Alexandrine, Latin or Western, and Byzantine or Eastern.

GRIESINGER, grē'zing-ēr, **Karl Theodor,** German author: b. Kirnbach, Baden, 1809; d. 1884. He studied at the Protestant Theological Seminary at Tübingen and became editor of a radical journal, his utterances in which incurred the censure of the government. He was accordingly imprisoned for two years. Shortly after his release he went to the United States, where he remained for five years. His impressions of the country are contained in 'Lebende Bilder aus Amerika' (1858); 'Emigrantengeschichten' (1858); 'Die alte Brauerei, oder Kriminalmysterien von New York' (3 vols., 1859); 'Land und Leute in America' (2d ed., 1863). The most important of his works on German life is his 'Die Maitressenwirtschaft in Deutschland im 17ten und 18ten Jahrhundert' (1874). His collected works were published in six volumes (1843–44).

GRIFFENFELDT, Count **Peder Schumacher,** Danish statesman: b. Copenhagen, 1635; d. Trondhjem, 12 March 1699. He was the son of a Danish merchant. His precocity in his studies manifested itself at an early age, and after receiving a liberal education in his native city, he spent eight years on the continent, studying at Germany, Netherlands, England, France and Spain. Everywhere he made acute observations on the politics of the various countries and by contrasting these with the government of his native state, began to shape the policies which determined his course. He returned to Denmark in 1662 and set about gaining the favor of Frederick III. Two purposes animated his zeal — personal ambition and the desire to place Denmark in the ascendancy. In 1663 he was appointed royal librarian and two years later became secretary to the king. On the death of the monarch he succeeded in maintaining the same confidential relation with Christian V, under whom he rose rapidly in power. In 1670 he became privy councillor; was raised to the peerage as Count of Griffenfeldt and finally became imperial chancellor. In this capacity he employed every means in his power toward rendering the government efficient both in its internal organization and its commercial relations. He advocated treaties with Sweden and France in order to maintain peaceful relations with these countries and avoid war. But this policy brought down on him the odium of a number of the ruling class of Denmark, which increased in proportion to his rising power. As a result of a conspiracy on the part of his enemies, he was suddenly arrested in 1676 and tried for treason and bribery. He was found guilty and condemned to death, but the sentence was later changed to life imprisonment.

GRIFFIN, Charles, American soldier: b. Licking County, Ohio, 1826; d. Galveston, Texas, 5 Sept. 1867. He was graduated at West Point (1847) and served through the Mexican War. In the Civil War he commanded the 5th artillery at the first battle of Bull Run, and on 6 May 1864 was brevetted lieutenant-colonel in recognition of gallant and meritorious services in the field. He was one of the commissioners to carry out the condition agreed upon by Generals Grant and Lee.

GRIFFIN, Gerald, Irish novelist: b. Limerick, Ireland, 12 Dec. 1803; d. Cork, 12 June 1840. He will be longest remembered for his novel ‘The Collegians’ (1829), upon which Boucicault's popular play, ‘The Colleen Bawn,’ is founded. Griffin was a poet as well as a writer of tales and the author of various lyrics popular with his countrymen.

GRIFFIN, Sir Lepel Henry, English diplomatist: b. Watford, 20 July 1838; d. London, 9 Mar. 1908. He entered the Bengal Civil Service in 1860. He was a tactful and successful administrator, and superintended the negotiations at Cabul which resulted in the return to the throne of Afghanistan of Abdur-Rahman. In 1885 he was envoy extraordinary to Peking. He was one of the founders of the *Asiatic Quarterly Review*. He has written ‘The Punjab Chiefs’ (1865); ‘The Rajahs of the Punjab’ (1870); ‘The Great Republic’ (1884), written in a spirit of great hostility to the United States.

GRIFFIN, Martin Joseph, Canadian journalist and librarian: b. Saint Johns, Newfoundland, 1847. He received his education at Saint Mary's College, Halifax, Nova Scotia, and practised law there for a time. From 1868–74 he was editor of the Halifax *Express*. After serving for two years as representative of the Toronto *Mail* at Ottawa, he became its editor-in-chief in 1881. He held this post until 1885, when he was appointed parliamentary librarian at Ottawa. He gained prestige also as a literary critic.

GRIFFIN, Simon Goodell, American soldier and statesman: b. Nelson, N. H., 1824; d. 1902. He sat in the New Hampshire State legislature in 1860. When the Civil War broke out he was appointed colonel of the First Brigade, Second Division, Ninth Army Corps, and took part in the siege of Vicksburg and the Mississippi campaign. In the battle of the Wilderness he was in command of the Second Brigade, Second Division, and was active at Spottsylvania. In 1864 he became brigadier-general of volunteers, and major-general of volunteers in 1865. On his return to his native State he settled at Keene and was elected five times to the New Hampshire legislature, being chosen speaker for the last two terms.

GRIFFIN, Walter Burley, American architect: b. Maywood, Ill., 1876. He studied at the University of Illinois and at the Massachusetts Institute of Technology, and began his career as a landscape architect. His principal achievement has been the plan for Canberra, the new capital of Australia. He was given charge of the execution of this work in 1913.

GRIFFIN, Ga., city and county-seat of Spalding County, on the Southern and the Central of Georgia railroads. It is the centre of a cotton and fruit region, the chief fruits being grapes and peaches. The city contains cotton-mills, a foundry and furniture factories; wine is also manufactured, and the manufacture of Turkish towels is extensive. The State Agricultural Experiment Station is located in the vicinity; and also a test farm of the Central of Georgia Railroad. The city owns and operates the electric-lighting plant and the water works. Pop. 7,478.

GRIFFIN, or GRYPHON, in mythology, a fabulous animal, usually represented with the body and legs of a lion and the head and wings of an eagle, signifying the union of strength and agility. Figures of griffins are frequently used as ornaments in works of art. It is employed as an emblem of vigilance, the animals being supposed to be the guardians of mines and hidden treasures. Figures of it are met with in tombs and sepulchral lamps, as guarding the remains of the deceased.

GRIFFIS, William Elliot, American clergyman and author: b. Philadelphia, 17 Sept. 1843. He served with the 44th Pennsylvania regiment in the Civil War, and then entered Rutgers College, where he was graduated in 1869. In 1870 he went to Japan to organize schools after American methods in the province of Echizen, where he made a study of the Japanese feudal system, of which he is the only living witness from interior residence. On the fall of the feudal system and the unification of the empire he was appointed professor of physical sciences in the Imperial University 1872–74, introducing technical education in the government schools. In 1874 he returned to the United States, where he was graduated from the Union Theological Seminary in 1877, and became pastor of the First Reformed Church in Schenectady, N. Y., 1877–86, of the Shawmut Congregational Church, Boston, 1886–93, and of the First Congregational Church of Ithaca, N. Y., 1893–1903. From 1903 he turned his attention wholly to literary work with the idea of helping to a better understanding the Oriental and Occidental civilizations. An authority on Japan, he also studied the Dutch origins of America and the influence of the Dutch in the formation of the United States. In 1905 he received the decoration of the Order of the Rising Sun from the Emperor of Japan. He has written ‘The Mikado's Empire’ (1876); ‘Japanese Fairy World’ (1880); ‘Asiatic History: China, Corea, and Japan’ (1881); ‘Corea — the Hermit Nation’ (1882); ‘Corea, Without and Within’ (1885); ‘Matthew Calbraith Perry’ (1887); ‘The Lily Among Thorns’ (1889); ‘Honda, the Samurai’ (1890); ‘Sir William Johnson and the Six Nations’ (1891); ‘Japan — in History, Folklore, and Art’ (1892); ‘Brave Little Holland and What She Taught Us’ (1894); ‘The Religions of Japan’ (1895); ‘Townsend Harris

— First American Envoy in Japan’ (1895); ‘Romance of Discovery’ (1897); ‘Romance of American Colonization’ (1898); ‘Romance of Conquest’ (1899); ‘The Pilgrims in Their Three Homes’ (1898); ‘The Students’ Motley’ (1898); ‘The American in Holland’ (1899); ‘America in the East’ (1899); ‘Verbeck of Japan’ (1900); ‘The Pathfinders of the Revolution’ (1900); ‘In the Mikado’s Service’ (1901); ‘A Maker of the New Orient’ (1902); ‘Young People’s History of Holland’ (1903); ‘Dux Christus, an Outline Study of Japan’ (1904); ‘The Japanese Nation in Evolution’ (1907); ‘The Firefly’s Lovers’ (1908); ‘The Story of New Netherland’ (1909); ‘China’s Story in Myth, Legend, Art, and Annals’ (1910); ‘The Unmannerly Tiger and Other Corean Tales’ (1911); ‘Belgium, the Land of Art’ (1912); ‘A Modern Pioneer in Korea’ (1912); ‘Hepburn of Japan’ (1913); ‘The House We Live In’ (1914); ‘The Mikado — Institution and Person’ (1915); ‘Millard Fillmore — Constructive Statesman’ (1915); ‘Dutch Fairy Tales for Young Folks’ (1918).

GRIFFITH, Francis Llewellyn, English Egyptologist: b. Brighton, 1862. He was graduated at Queen’s College, Oxford, and with Mr. Flinders Petrie and M. Naville spent several years in archæological work in Egypt. He was appointed assistant in the British Museum (1888–96); assistant professor of Egyptology at University College, London (1892–1901); lecturer at the University of Manchester (1896–1908), and has been reader in Egyptology at Oxford since 1901. In 1910 he went to Nubia, where he superintended the Oxford archæological investigations. He is the author of ‘The Inscriptions of Siût and Der Rifeh’ (1889); ‘Hieratic Papyri from Kahûn and Gurob’ (1898); ‘Stories of the High Priests of Memphis’ (1900); ‘Demotic Magical Papyri’ (with Sir Herbert Thompson, 1904–09); ‘Catalogue of Demotic Papyri in the Rylands Library’ (1909); ‘Meroitic Inscriptions’ (1911–12); ‘The Nubian Texts of the Christian Period’ (1913).

GRIFFITH, Ralph Thomas Hotchkin, English scholar and educator: b. Corsley, Wiltshire, 1826; d. 1906. He received his education at Queen’s College, Oxford, then went to India, where he was principal of Benares College (1863–78); and Director of Public Instruction of the Northwest Provinces (1878–85). Among his works are ‘Specimens of Old Indian Poetry’ (1852); ‘The Birth of the War God’ (1853); ‘Idylls from the Sanskrit’ (1866); ‘The Rāmāyan of Valmiki’ (1895); ‘Yūsúf and Zulaikha’ (1882); ‘The Hymns of the Rig Veda, Metrically Translated into English’ (4 vols., 1889–92); ‘The Sāma Veda’ (1893); ‘The Atharva Veda’ (1895–96); ‘The Texts of the White Yajur Veda’ (1899).

GRIFFITH, Sir Richard John, Irish geologist and civil engineer: b. Dublin, 1784; d. 1878. He was educated at London and at Edinburgh, and in 1809 investigated the bogs of Ireland for the government. He was appointed professor of geology and mining engineering for the Royal Dublin Society in 1812. From 1822 to 1830 he was supervisor of extensive road improvements in Ireland and also served as commissioner of valuation (1827–68). The most important of his publications was the ‘Geological Map of Ireland’ (1815; and again in 1836 and 1855). Others are ‘Outline of the Geology of Ireland’ (1838); ‘Fossils of the Mountain Limestone of Ireland’ (1842); and, with F. McCoy, ‘A Synopsis of the Characters of the Carboniferous Limestone Fossils of Ireland’ (1844); and ‘A Synopsis of the Silurian Fossils of Ireland’ (1846).

GRIFFITH, Robert Stanislaus, American naval engineer: b. Fredericksburg, Va., 27 Sept. 1857. He was graduated at Annapolis, and entered the United States navy. He saw service in the Spanish-American War, and in 1903 became fleet engineer of the European squadron. In the following year he occupied a similar position with the North Atlantic fleet. In 1913 he was appointed engineer-in-chief of the United States navy, with the rank of rear-admiral. In the same year he became president of the American Society of Naval Engineers. Columbia University conferred on him the degree of Doctor of Science in 1915.

GRIFFITHS, David, American botanist: b. Aberystwith, Wales, 16 Aug. 1867. His family emigrated to the United States and Griffiths was sent to the Agricultural College at Brookings, S. D. He continued his studies at Columbia University, taught in the South Dakota schools (1889–98), became professor of botany at the University of Arizona (1900–01), agrostologist (1901–07) and was appointed agriculturist in the United States Department of Agriculture in 1907. Of his works on agriculture the most important are the bulletins issued for the Department on forage and range conditions in the Western States and a monograph on the *Sordariaceæ* of North America.

GRIFFITHS, Ernest Howard, English scientist: b. Brecon, 15 June 1851. He was educated at Owens College, Manchester, and Sidney Sussex College, Cambridge. Since 1901 he has been principal and professor of experimental philosophy at University College of South Wales and Monmouthshire, Cardiff. In 1907 he was awarded the Hughes gold medal by the Royal Society for his contributions to the study of exact physical measurements. His publications include ‘The Thermal Measurement of Energy’ (1901) and numerous papers on the subjects of heat and electricity.

GRIFFON, or BASSETT-GRIFFON, a large, grayish-red field-dog, combining the qualities of both pointer and setter, but having a thick, hard coat, enabling it to work readily in thickets and rough country. It originated in Germany at the end of the 19th century.

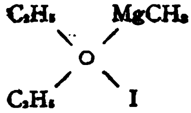
GRIGGS, Edward Howard, American author and lecturer: b. Owatonna, Minn., 9 Jan. 1868. In 1889 he was graduated from Indiana University (A.M., 1890), where he was instructor in English literature in 1889–91 and professor of literature in 1892–93. He also studied at the University of Berlin. At Leland Stanford he was assistant professor of ethics 1891–92, and professor of ethics 1893–97, and head of the department of ethics and education in 1897–98. After 1899 he became author and lecturer, giving university extension courses in all parts of the United States and Canada. He is president of the department of philosophy at the Brooklyn Institute of Arts and Sciences. He has published ‘The New Humanism’

(1900); 'A Book of Meditations' (1902); 'Moral Education' (1904); 'The Use of the Margin' (1906); 'Human Equipment' (1908); 'The Philosophy of Plato' (1910); 'Human Progress' (1912); 'The Philosophy of Art' (1913); 'Self-Culture Through the Vocation' (1914); 'Friendship, Love, and Marriage' (1915); 'The Soul of Democracy' (1918); also 12 handbooks to courses of lectures and guides for study clubs.

GRIGGS, John William, American lawyer: b. Newton, N. J., 10 July 1849. He was graduated at Lafayette College in 1868, and was admitted to the bar in 1871, practising in Paterson, N. J. He was a member of the New Jersey general assembly, 1876–77; a state senator, 1882–88; and president of the state senate in 1886. He became governor of New Jersey 1 Jan. 1896, resigning 31 Jan. 1898 to become Attorney-General in President McKinley's Cabinet. He resigned in April 1901 to become member of the Permanent Court of Arbitration at The Hague.

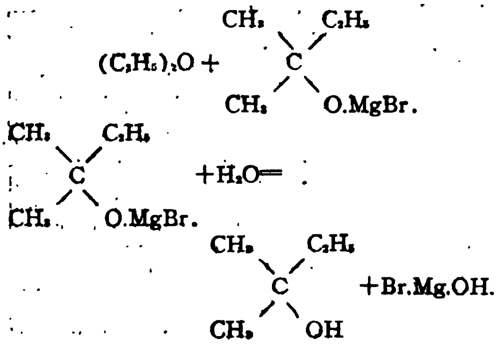
GRIGNARD, grē'nyär', French chemist: b. Cherbourg, 1871. He received his education at the École Normale at Cluny and at the University of Lyons. His principal research has been in the study of synthetic chemistry, for which he was awarded half of the Nobel prize in chemistry in 1912. In 1905 he delivered lectures in chemistry at Besançon; taught at Lyons (1906–09), becoming professor at Nancy in 1910. His writings have appeared in various chemical journals. See GRIGNARD'S REAGENTS.

GRIGNARD'S REAGENTS. When an alkyl haloid, such as methyl iodide, CH_3I, is added to dry magnesium powder suspended in an ether such as ordinary ethyl ether $(C_2H_5)_2O$, a very reactive compound, known as a *grignard reagent* (after V. Grignard, who discovered them in 1900 under the direction of Professor Barbier) is formed. In the case just discussed, it appears to have the structural formula attributed to it by Baeyer, viz:



with tetravalent oxygen. The Grignard reagents are invaluable in organic synthesis on account of the number and variety of constructive reactions into which they enter. For example, they enable us to form tertiary alcohols from ketones as follows:

$$CH_3.CO.CH_3+(C_2H_5)_2OBr.MgC_2H_5=$$

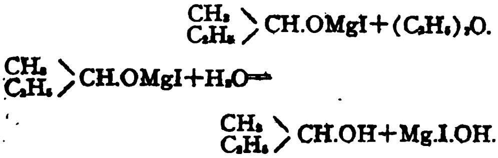


Again, we can form tertiary alcohols from acid chlorides.

$$CH_3.CO.Cl+2CH_3.Mg.I.O.(C_2H_5)_2=(C_2H_5)_2O+ (CH_3)_3C.O.MgI+MgICl.$$

A closely similar reaction takes place with organic esters. Secondary alcohols can be made from aldehydes and Grignard reagents: e.g.

$$CH_3.CHO+C_2H_5.Mg.I.O.(C_2H_5)_2=$$



$$\begin{matrix}CH_3\\C_2H_5\end{matrix}\!\!>CH.OMgI+(C_2H_5)_2O.$$

$$\begin{matrix}CH_3\\C_2H_5\end{matrix}\!\!>CH.OMgI+H_2O=\begin{matrix}CH_3\\C_2H_5\end{matrix}\!\!>CH.OH+Mg.I.OH.$$

Fatty acids may be prepared from Grignard reagents and carbon dioxide.

$$C_nH_{2n+1}.Mg.I.O.(C_2H_5)_2+CO_2= C_nH_{2n+1}.CO.OMgI+(C_2H_5)_2O$$

$$2C_nH_{2n+1}.CO.OMgI+H_2SO_4= 2C_nH_{2n+1}.CO.OH+MgI_2+MgSO_4$$

Hydrocarbons may be built up by Grignard reactions.

$$R.Mg.Br.O.(C_2H_5)_2+BrR'=RR'+MgBr_2+ (C_2H_5)_2O.$$

Bromo-derivatives may be transformed into corresponding iodo-compounds.

$$RBr \xrightarrow[Mg]{} R.Mg.Br.O.(C_2H_5)_2 \xrightarrow[I_2]{} RI$$

Aromatic Grignard compounds exist, and react much like their aliphatic analogues. Among the organic Grignard reactions is that by which benzaldehyde is prepared from ethyl orthoformate.

$$C_6H_5.Mg.Br.O.(C_2H_5)_2+CH(OC_2H_5)_3= (C_2H_5)_2O+Mg.Br:O.C_2H_5+C_6H_5.CH(OC_2H_5)_2$$

$$C_6H_5.CH.(OC_2H_5)_2+H_2O= C_6H_5.CHO+2C_2H_5OH$$

Ketones may be synthesised from nitriles

$$R.CN + R'Mg.I.O.(C_2H_5)_2= (C_2H_5)_2O + RR'C:NMgI.$$

$$RR'C:NMgI+2H_2O= R.CO.R'+NH_3+I.Mg.OH.$$

In 1904 Baeyer showed that the Grignard reagents were formed with greater ease if the magnesium had been previously heated with iodine. After the completion of the Grignard reaction, the mixture is poured into acidulated water, and the product is purified by distillation or crystallization.

GRIGOROVITCH, grē-gō-rō'vĭch, **Dmitri Vasilyevitch**, Russian artist, novelist and historian of art: b. 19 March 1822, at the village of Nikólskoye in the province of Simbrisk, on the Volga; d. 1900. His father was a retired hussar of the Great Katharine's time. His mother was the daughter of a French émigré, named De Barmont. When the boy was seven years old, his parents went to the father's estate at Dumbinó, not far from the city of Tula. After the custom of landed proprietors his education was entrusted to governesses and tutors, until he was ten, when he was sent by his mother, then a widow, to Moscow, where he attended a boarding-school kept by an Italian of artistic tendencies. There he learned several foreign languages. When he was 14 he went to Petersburg and studied with the famous engineer, Kostomárof, who fitted him to enter the Mikhaïlóvsky Engineering School. But his heart was not in that career and after a rather unhappy year he entered the Art Academy where he was instructed by the great artist, Tamárinsky. His first inclination to painting had been stimulated when he was a child by his discovery among his mother's possessions of a portfolio of drawings and he had early manifested a considerable talent for sketching. He made good progress and when he had finished his studies he was engaged to furnish various articles for Leontof's 'Encyclopedic Lexicon.' He also contributed to Plyeshar's 'One Hundred and One Tales and Forty-Forties of Anecdotes' a number of translations and original stories. He made the acquaintance of Nikolái Ivánovitch Gryetch and the famous poet, Nekrásof, both contributors to Krayevsky's *Literary Gazette* and he contributed to that brilliant periodical a number of short stories. In 1846 he left Petersburg and settled in the country, where he continued his literary activities, contributing to the *Annals of the Fatherland* (*Otyétchesvennuiya Zapiski*) and to the *Contemporary* (*Sovreménnik*). In these appeared his best-known stories 'Anton Goryemka,' 'The Landless Peasant' ('Bobuil'), 'Brief Riches' ('Nyedolgoye Bogatsvo'), 'Four Years' ('Chetuírye Vrémenyi goda'), 'The Fishermen' ('Ruibaki'), 'The Emigrants' ('Peresyélentsui') and others. In 1858, while at the very height of his successful literary career he was suddenly called to the Ministry of the Marine and spent a year in the Mediterranean on the cruiser *Retvisán*. He utilized this experience in a series of sketches published under the title 'Korabl Retvizán,' with a subtitle, 'A Year in Europe and in European Waters.' This practically closed his literary activities. In 1863 he became secretary of the Society for the Encouragement of Artists and for many years he devoted his energies to this worthy object. His works of fiction make a series of eight volumes. Several others are devoted to his articles on the 'History and Theory of Art.'

NATHAN HASKELL DOLE.

GRIJALVA, grē-hāl'vä, **Juan de**, Spanish navigator, the discoverer of Mexico: b. Cuellar in Old Castile, 1489 or 1490; d. Nicaragua, 21 Jan. 1527. He was intrusted by his uncle, Don Diego Velasquez, the first governor of Cuba, with the command of a fleet of four vessels, which, on 1 May 1518, sailed from Saint Jago de Cuba, to complete the discoveries which Fernandez de Cordova had made in Yucatan the year preceding. Rounding the peninsula of Yucatan, he extended his explorations as far as the province of Panuco, giving his name and that of his companion, Alvarado, afterward famous in the expedition of Cortes, to two rivers on the coast. His communication with the Aztecs was friendly, and so profitable that he was enabled to send back one of the ships well freighted with gold, jewels and other treasures, the acquisition of which was one of the main objects of the expedition. On his return to Cuba he found an expedition organizing for the conquest of Mexico, with Cortes at the head, and was received by Velasquez with reproaches for having neglected to plant colonies on the coast. Grijalva, a man of integrity and prudence, had, however, acted strictly in conformity with his instructions and against his own judgment. In the latter part of his life he settled in Nicaragua, and was slain in an outbreak of the Indians in the valley of Ulancho. Consult the Hakluyt Society's edition of Diaz del Castillo's 'True History of the Conquest of New Spain' (4 vols., 1908–12).

GRILLET, grē'yā', **Jean**, French Jesuit explorer: b. about 1630; d. about 1676. He was superior of a Jesuit mission at Cayenne. After the English occupation of Guiana (1666), he was sent on a tour of exploration into the interior of that country. With Father François Béchamel, he succeeded in penetrating the hitherto unexplored country of the Acoquas, about 600 miles southwest of Cayenne. On their return to the mission, the two fathers published an account of their journey under the title 'Journal du voyage qu'ont fait les pères Jean Grillet et François Béchamel dans la Guyane, l'an 1674,' which was later embodied in Gomberville, 'Relation de la rivière des Amazons' (1679–80) and again in Roger, 'Voyage around the World' (Amsterdam 1716).

GRILLPARZER, gril'pārt-sĕr, **Franz**, Austrian poet and dramatist: b. Vienna, 15 Jan. 1791; d. there, 21 Jan. 1872. His early education was conducted in a desultory fashion; in 1807 he began the study of jurisprudence at the University of Vienna, but his father's death in 1809 leaving the family in needy circumstances, Franz was oblized to become a private tutor. In 1813 he was appointed to a post in the court library, but as it involved no remuneration he abandoned it after a short time and became a clerk in the revenue administration of Lower Austria. In 1818 he was appointed poet to the Holburg Theatre and also became connected with the department of the exchequer in the same year. He was made director of the archives of that department in 1832 and retired in 1856. He regarded his official positions merely as a means of maintaining his independence while furthering his literary career. Upon his retirement he received the title of Hofrat.

His literary career began with the tragedy of 'Blanca von Castilien' in 1807–09, a close imitation of Schiller's 'Don Carlos.' It was followed by 'Spartacus' and 'Alfred der Grosse,' but Grillparzer remained unknown to literary fame until 1817, when 'Die Ahnfrau' was first presented. It was a great success in Austria and Germany, but the fact that the critics at once placed the author in the same category with Müllner and Houwald greatly annoyed Grillparzer, who disliked being rated as a "fate-dramatist." The year 1818 saw the production of 'Sappho,' a veritable classic after the manner of the 'Tasso' of Goethe and in which the poet first showed his true genius. 'Das goldene Vliess' appeared in 1821. One of the greatest trilogies in German literature, it was not a great success on the stage, due, the author claimed, to the pernicious influence of Metternich. In 1823 he completed his historical tragedy, 'König Ottokars Glück und Ende,' but difficulties with the censor prevented its production until 1825. It portrayed the fall of Ottokar of Bohemia in his struggle with Rudolph of Hapsburg. In 1828 Grillparzer brought out another historical tragedy ‹Ein treuer Diener seines Herrn,› written two years previously. It was rather too didactic for the period and was coolly received. A sad period now intervened in the poet's life. A visit to Goethe at Weimar about this time led him to contrast the intellectual freedom of Saxony with the narrow, obscurantist policy of Metternich at Vienna, where he himself was constantly embroiled with the public authorities. To this must be added his hopeless love for Katharina Fröhlich. Feeling that all happiness was denied him, the poet shrank from marriage although seemingly his love was requited. His despair was expressed in ‹Tristia ex Ponto› (1835).

In 1831 he finished his greatest drama, ‹Des Meeres und der Liebe Wellen,› a new version of the story of Hero and Leander, and perhaps the greatest of German love-tragedies. ‹Der Traum, ein Leben› was completed in 1834; it is the author's technical masterpiece and has been called «the Austrian ‹Faust.›» It was followed in 1838 by the comedy, ‹Weh dem, der lügt,› which was not well received. Thereafter the author was disheartened and turned away from the theatre for ever. He visited Paris and London in 1836 and the near East in 1843. The revolution of 1848 came too late to arouse him from his pessimistic outlook on life. True, his plays were reinstated in Vienna and honors were showered upon him, his 80th birthday being celebrated as a national holiday, but he held aloof from the theatre. At his death he left three tragedies among his papers. These are ‹Die Jüdin von Toledo›; ‹Ein Bruderzwist im Hause Habsburg› and ‹Libussa.› It was not until almost a full quarter of a century after his death that his countrymen realized that he was a dramatist and poet of first rank, and the connecting link between Goethe, Lessing and Schiller and the moderns. Consult Ehrhard, ‹Franz Grillparzer: Te théâtre en Autriche› (Paris 1900); Friedmann, ‹Il dramma tedesco del nostro secolo› (Vol. III, Milan 1893); Lange, ‹Grillparzer, sein Leben, Dichten und Denken› (Gütersloh 1894); Littrow-Bischoff, ‹Aus dem persönlichen Verkehr mit Franz Grillparzer› (Vienna 1873); Sittenberger, ‹Grillparzer› (Berlin 1903); Traube, ‹Grillparzers Lebensgeschichte› (Stuttgart 1884); and Saur, ‹Introduction to Grillparzer's Works› (ib. 1892). See SAPPHO.

GRILSE, a young salmon (q.v.).

GRIMALDI, gre-mäl'de, Guelph family of Genoa and Italy, princes of Monaco until the middle of the 18th century. The most distinguished members were RAINERIO, who as admiral of France, rendered important service to Philip the Fair in 1304 in the battle against Guy of Flanders. ANTONIO, also a naval commander. After several successful encounters with the Catalans, he was defeated in 1353 by the Venetian and Araganese fleets near Sardinia. DOMENICO, a naval officer and prelate. He was appointed Cardinal and Vice-Legate of Avignon. GERONIMO, a cardinal: b. 1579; d. 1685. His reforms of the clergy, and his philanthropic measures were the main features of his vigorous policy. The male line of the family died out in 1731 and the name of Grimaldi was added to that of the ruling house of Monaco, Goyon-Matignon. Consult De Jolan, ‹Histoire et généalogie des Grimaldi› (Nice 1900).

GRIMALDI, Francesco Maria, Italian physicist: b. Bologna, 2 April 1613; d. Bologna, 28 Dec. 1663. In 1632 he became a Jesuit, and for 25 years taught literature in Jesuit colleges. His chief interest, however, was in natural science. He experimented on falling bodies and undertook geodetic surveys. He made a chart of the moon, and we owe to him much of the lunar nomenclature. He discovered the diffraction of light, interference, and the dispersion induced by a prism. He conjectured that light was immaterial in nature. He wrote ‹Physicomathesis de Lumine, Coloribus, et Eride, Aliisque Annexis› (Bologna 1665), published posthumously.

GRIMALDI, Giovanni Francesco, IL BOLOGNESE, Italian architect and painter: b. Bologna, 1600; d. Rome, 1680. He was a relative of the Caracci and a pupil of Albani. Settling at Rome, he became architect and painter to Pope Paul V and his successors. About 1648 he was employed by Cardinal Mazarin at Paris in the planning of several buildings and in painting frescoes for the Louvre. Among his works ars some landscapes (Colonna Gallery, Rome), a series of Old Testament scenes (Quirinal, Rome); other landscapes at the National Library, Paris, at the Louvre, the Vatican and a number at the Imperial Gallery, Vienna. He also made some admirable etchings of his own landscapes as well as of the paintings of Titan and the Caracci. He was twice chosen president of the Academy of Saint Luke at Rome.

GRIMALDI, Joseph, English clown: b. London, 18 Dec. 1779; d. London, 31 May 1837. He was the son of an Italian actor and performed on the stage from the age of two years until his retirement in 1828. Sadler's Wells was the scene of most of his performances. His best rôle was in the pantomime of «Mother Goose,» first produced in 1806. Consult ‹Memoirs of Joseph Grimaldi› (ed. by Charles Dickens, New York 1838).

GRIMES, Bryan, Confederate soldier: b. Pitt County, N. C., 1828; d. there, 1880. After studying at the University of North Carolina, he was chosen a member of the Raleigh convention which framed the Ordinance of Secession (1861). Enlisting in the Confederate service, he became major of the Fourth North Carolina Regiment. He rendered important service at Fair Oaks and in the campaign in Maryland, commanding the Fifth Brigade of Jackson's army. He was also active at Chancellorsville, Gettysburg, and in the Shenandoah Valley campaign. In 1865, he was commissioned major general, and retired to his estate in North Carolina, where he engaged in planting. Here he met death at the hands of an assassin.

GRIMES, James Wilson, American politician and legislator: b. Deering, Hillsboro County, N. H., 20 Oct. 1816; d. Burlington, Ia., 7 Feb. 1872. He was graduated at Dartmouth College (1836), and went west, where he began the practice of the law, was appointed secretary of a commission instituted to negotiate the transfer of lands from the Sac and Fox Indians, and after the organization of Iowa

Territory in 1838, he was elected to its legislature. He was elected governor of Iowa in 1854, and after completing his term, was sent to Congress as a Republican Senator. He voted for the acquittal of President Johnson at his impeachment trial.

GRIMKÉ, grim'kė, **Archibald Henry,** American lawyer: b. near Charleston, S. C., 17 Aug. 1849. He was graduated from Lincoln University in 1870, from the Harvard Law School in 1874, and in 1883–85 was editor of the 'Hub,' a Boston newspaper. In 1891–92 he was a special writer for the Boston *Herald* and *Traveller,* and in 1894–98 United States consul at Santo Domingo. He is president of the American Negro Academy; president of the Frederick Douglass Memorial and Historical Association; vice-president of the National Association for the Advancement of Colored People and trustee of the Estate of Emmeline Cushing for the education of colored people, member of the Authors' League of America. His writings include a 'Life of William Lloyd Garrison' (1891), a 'Life of Charles Sumner' (1892), and numerous contributions in periodicals, dealing chiefly with various questions pertaining to the American negro.

GRIMKÉ, Thomas Smith, American lawyer and scholar: b. Charleston, S. C., 26 Sept. 1786; d. near Columbus, Ohio, 12 Oct. 1834. He was graduated at Yale College in 1807, studied law at Charleston and rose to eminence at the bar and in the politics of his State. He became widely known by his addresses in behalf of peace, religion and literature. An early and prominent advocate of the American Peace Society, he held the opinion that even defensive warfare is wicked. Though a superior classical scholar, he maintained that neither the classics nor mathematics should enter into any scheme of general education in this country. In some of his pamphlets he introduced a new system of orthography of the English language. A volume of his addresses was published at New Haven in 1831.

GRIMKÉ SISTERS, The, SARAH MOORE, and ANGELINA EMILY: b. Charleston, S. C., 1792 and 1805; d. Hyde Park, near Boston, 1873 and 1879. They were sisters of Thomas Smith Grimké (q.v.). They liberated their slaves, removed to Philadelphia, entered the Society of Friends, and became known in connection with the Anti-slavery movement. They went to New York in 1836 and in the year following to Boston; were leaders in the American Anti-Slavery Society, and appeared as platform speakers on slavery. In 1854 they established a successful coeducational academy at Eagleswood (near Perth Amboy), N. J. Sarah lectured also on woman's rights. Angelina wrote 'An Appeal to the Christian Women of the South'; Sarah an 'Epistle to the Clergy of the Southern States.'

GRIMM, Friedrich Melchior, BARON VON, French author: b. Ratisbon, 26 Dec. 1723; d. Gotha, 19 Dec. 1807. Having completed his studies at Leipzig he accompanied the young Count de Schönberg to Paris. Here he became reader to the Crown Prince of Saxe-Gotha, but the situation was not remunerative, and Grimm was in straightened circumstances when he became acquainted with Rousseau. The latter introduced him to Diderot, Baron Holbach, Madame d'Epinay, and other distinguished persons, and he soon became a general favorite. His connection with the Encyclopedists, and his intellectual gifts and versatility of mind, soon opened to him a brilliant career. He became secretary to the Duke of Orleans, and began to write his literary bulletins for several German princes, containing the ablest analysis of all the more important French works. It is believed that in these works he was assisted by the Abbé Raynal and Diderot. In 1776 he was raised by the Duke of Gotha to the rank of baron, and appointed Minister Plenipotentiary at the French court. On the outbreak of the French Revolution he withdrew to Gotha, and in 1795 the Empress of Russia appointed him her Minister Plenipotentiary at Hamburg. In ill-health, he returned to Gotha, where he died. His 'Correspondance littéraire, philosophique et critique' was published after his death. A supplement is the 'Correspondance inédite Grimm et Diderot' (Paris 1829), containing a complete history of French literature from 1753 to 1790, and remarkable for brilliant and piquant criticism. Consult the edition of Grimm's works by Tourneux (16 vols., Paris 1877–82), Georges, K. A., 'Friedrich Melchior Grimm' (Leipzig 1904); Sainte-Beuve, 'Etudes sur Grimm' (Paris 1854); id., 'Causeries du lundi' (Vol. VII, ib. 1857–62).

GRIMM, Hermann, German author: b. Cassel, 1828; d. Berlin, 1901. He was the son of Wilhelm Karl Grimm (q.v.), and was sent to Berlin and then to Bonn for his education. He succeeded to the professorship of art history at Berlin University in 1872. Besides his critical and historical works, among which the most important are his 'Das Leben Michelangelos' (2 vols., 1860–63), and 'Goethe,' he wrote some poems 'Traum und Erwachen' (1854); a tragedy, 'Demetrius'; and a novel 'Überwendliche Mächte' (3 vols., 1867). See MICHELANGELO, LIFE OF.

GRIMM, Jakob Ludwig, German philologist: b. Hanau, Hesse-Cassel, 4 Jan. 1785; d. Berlin, 20 Sept. 1863. He studied philology and law at Marburg, and later studied many subjects at Paris under Savigny. He returned to Germany in 1805 and for a time was employed in the office of the Minister of War at Cassel. In 1806 he became librarian to Jerome Bonaparte, king of Westphalia; and from 1816 to 1829 occupied the post of second librarian at Cassel. From 1830 to 1837 he resided at Göttingen as professor and librarian, lecturing on the German language, literature and legal antiquities. Having, with six other professors, resisted the unconstitutional encroachments of the king of Hanover, he was banished, and after his retirement to Cassel, he was, in 1841, called to Berlin as a professor and member of the Academy of Sciences. He sat in the National Assembly of 1848, and in that of Gotha in 1849. From that time till his death, he occupied himself only with his various publications. He wrote on German mythology, German legal antiquities, the history of the German language, and published old German poems, etc. His two greatest works, both unfinished, are his 'Deutsche Grammatik' (1819–37), and his 'Deutsches Wörterbuch' commenced in 1852, in conjunction with his brother Wilhelm (q.v.), and gradually completed by eminent scholars. He also published in company with his brother, the 'Kinder und Hausmärchen,' one of the most popular collections of juvenile fairy tales. His 'Deutsche Rechtsaltertümer' (1828; 4th ed. 1899); and 'Deutsche Mythologie' (1835), are authoritative on mediæval traditions, literatures and social customs. Other important works by him are 'Geschichte der deutschen Sprache' (1848; 4th ed., 1880); 'Ueber den Urspung der Sprache' (1851); 'Gammer Grethel's Fairy Tales' (1862); 'Kleinere Schriften,' a collection of his essays and other articles (8 vols., 1864–90). Consult Duncker, 'Die Brüder Grimm' (Kassel 1884); Francke 'Die Brüder Grimm: ihr Leben und Wirken in gemeinfasslicher Weise dargestellt' (Dresden 1899); Scherer, 'Jacob Grimm' (Berlin 1885); Tonnelat, 'Les frères Grimm, leur oeuvre de jeunesse' (Paris 1912); 'Les contes des frères Grimm, étude sur la composition et le style du recueil des Kinder-und Hausmärchen' (ib., 1912).

GRIMM, Wilhelm Karl, German philologist: b. Hanau, 24 Feb. 1786; d. Cassel, 16 Dec. 1859. He was the companion in study of his brother, Jakob Grimm (q.v.), at the Lyceum of Cassel, the University of Marburg, and again at Göttingen, where in 1830 he was appointed under-librarian and supernumerary professor of philosophy. He joined his brother in the protest against the King of Hanover, shared his exile, and also his call to Berlin. There they labored together, and were commonly known at the Brothers Grimm. Under that name also they have a certain immortality in the affections of the civilized world. His earliest independent work was a German translation of the Danish 'Kœmpe-Viser' (1811–13). He edited many old German texts and collaborated with his brother Jakob in several of his works. His own most important book is 'Die deutsche Heldensage' (1867); 'Kleinere Schriften' (1881–86); 'Altdänische Heldenlieder' (1811–13), a translation; 'Altdeutsche Gespräche' (Berlin 1851); 'Friedank' (1834; 2d ed., 1860); 'Ruolandslied' (1838); 'Athis und Prophilias' (1846). See GRIMM, JAKOB L., and consult authorities there referred to; also Steig, 'Goethe and die Brüder Grimm,' (Berlin 1892).

GRIMMA, Saxony, town on the left bank of the Mulde; on the Döbeln-Dresden Railroad, 19 miles southeast of Leipzig. The principal buildings are the old castle dating from the 12th, the town hall from the 15th, and the Catholic church from the 13th centuries; the old Fürstenschule, founded in 1550 on the site of the old Augustinian monastery and moved to a new building in 1892; the teachers' seminary; the brewers' school and commercial school. A point of historical interest in the neighborhood is the convent of Nimbschen which once sheltered Luther's wife, Katharina von Bora. Important manufactures of leather, gloves, vehicles, paper are carried on, and there are also large iron works, machine shops and dyeworks. Pop. 11,500. Consult Fraustadt, 'Grimmenser Stammbuch' (Grimma 1900).

GRIMMELSHAUSEN, grim'mels-how-sen, **Hans Jakob Kristoffel von,** German novelist: b. Gelnhausen, about 1625; d. Renchen, 17 Aug. 1676. At an early age he appears to have been present in the Thirty Years' War, and on his return entered the service of the bishop of Strassburg, Franz Egon von Fürstenberg. His appointment to the post of magistrate at Renchen gave him the opportunity of developing his literary proclivities. In 1668 appeared his 'Der abenteuerliche Simplicissimus, Teutsch, das ist; Aie Beschreibung des Lebens eines seltsamen Vaganten, genannt Melchior Sternfels von Fuchsheim.' It is a tale of adventure, remarkable for the vivid descriptions of the Thirty Years' War. Its style shows the marked influence of the Spanish picaresque novel and is highly colored by the military experiences of the author. Against the staid literature of the century in Germany, 'Simplicissimus' stands out in bold relief. In the same vein Grimmelshausen wrote 'Simplicianische Schriften: Die Erzbetrügerin und Lanstörtzerin Courascheliche Vogelnest' (about 1669); 'Der seltsame Springinsfeld' (1670); 'Das wunderbarliche Vogelnest' (1672); 'Dietwalt und Amelinde' (1670), a group of satirical studies of the times; and 'Joseph,' a novel based on the biblical narrative. The 'Simplicissimus' has been edited by A. von Keller (in 'Bibliotek des litterarischen Vereins' (4 vols., Stuttgart 1852–62); by H. Kurz (in 'Deutschen Bibliotek,' Vols. III–VI, Leipzig 1863–64); by von Tittman (in 'Deutsche Dichter des 17ten Jahrhunderts,' Vols. VII, VIII, X and XI, Leipzig 1877).

GRIMM'S LAW is the name given to the rule which regulates the *Lautverschiebung,* or permutation of certain primitive consonants, which takes place in the Teutonic languages. The law, as finally formulated by Jakob Grimm, is that if the same roots or words exist in Sanskrit, Greek and generally in Latin, Celtic, Lettic and Slavonic, and also in Gothic, English, Dutch and other Low German dialects on the one hand, and in Old High German on the other, the following correspondences are to be expected: (1) Gothic has a soft mute, and High German a hard mute, in place of the corresponding aspirate in Sanskrit and Greek; (2) Gothic has a hard mute, and High German an aspirate, in place of the corresponding soft mute in Sanskrit and Greek; (3) Gothic has an aspirate, and High German a soft mute, in place of the corresponding hard mute in Sanskrit and Greek. Thus, a primitive *th* becomes *d* in Low German, and *t* in High German, as in the words *th*ugatēr, *d*aughter, *t*ochter. A primitive *d* becomes *t* in Low German, and *z* in High German, as in *d*uo, *t*wo, *z*wie; or *d*ens, *t*ooth, *z*ahn; or *d*ecem, *t*en, *z*ehn. A primitive *t* becomes *th* in Low German, and *d* in High German, as in *t*res, *th*ree, *d*rei; or *t*u, *th*ou, *d*u; or *t*enuis, *th*in, *d*ünn. Similar changes affect the labials and gutturals, as in *p*ecus, *f*ee, *v*ieh; *p*ater, *f*ather, *v*ater; *f*agus, *b*eech, *p*uocha; and in oculus, e*gh*e («eye»), au*g*e; *qu*is, *w*ho, *w*er; or *kh*ortus, *g*arden, *k*orto. The normal changes are set forth in the following table:

	Labials			Dentals			Gutturals		
Greek, etc..........	p	b	ph	t	d	th	k	g	kh
Gothic etc..........	f	p	b	th	t	d	(h)	k	g
Old High German..	b	(v) f	p	d	z	t	g(h)	ch	k

The credit of the discovery of the *Lautverschiebung* is not wholly due to Jakob Grimm. Ihre and Rask had discovered, as early as 1818, the law of the transmutation of consonants in Greek and Gothic, while Grimm, in the second edition of his 'Deutsche Grammatik' which appeared in 1822, added the corresponding changes in Old High German, and formulated the law as it now stands.

Grimm's Law may be interfered with by the action of other laws, especially by the position of the accent, as formulated in Verner's Law (q.v.). Thus *fráter* is accented on the first syllable and *patér* on the second, consequently, though we have *brother* and *father* in English, we find *bruder* and *vater* in High German. The accent in *patér* has interfered with the regular action of the *Lautverschiebung*, and prevented the normal change of *t* to *d* from taking place.

Thus Grimm's Law may be defined as the statement of certain phonetic facts which happen invariably unless they are interfered with by other facts. The great use of Grimm's Law, in addition to the identification of words in different languages, is in the detection of loan words. Any etymology which violates Grimm's Law, as qualified by other phonetic laws, must be rejected unless it can be explained as a loan word. The causes which brought about the changes formulated in Grimm's Law are obscure. They are probably due to the settlement of Low German conquerors in central and southern Germany. Consult Douse, 'Grimm's Law: a Study of Lautvershiebung' (1876); Max Müller, 'Lectures on the Study of Language' (2d series, lecture v, 1864); Morris, 'Historical Outlines of English Accidence' (Chap. 2, 1872).

GRIMSBY, Ontario, Canada, village of Lincoln County, on Lake Ontario and on the Grand Trunk Railway. The chief occupations are the manufacture of stoves, electrical fittings, canning and wood planing. Fruit is extensively raised in the vicinity. Pop. 1,700.

GRIMSBY, Great, England, seaport of Lincolnshire, also a municipal, county and parliamentary borough, on the south shore and near the mouth of the Humber River. It is situated 20 miles southeast of Hull and 155 miles east northeast of London, on the Great Northern and Great Central railways. The principal buildings are the old church of Saint James; the town hall, the exchange, the grammar school dating from the 16th century, the theatre, library, technical school, the Harbor of Refuge for sailors and fishermen, the public gardens donated by the Duke of York in 1894 and the docks and customs house. It is as a seaport that Grimsby is famous. Its extensive docks and harbors, including those at Immingham, built by the Great Central Railway, cover an area of some 360 acres. Besides being an outlet for internal trade, Grimsby is also a centre of commerce with Holland, Sweden, Denmark and Germany. The chief exports are woolen goods and yarns, machinery, coal and fuel. It imports butter, wool, timber, foodstuffs, cotton, meat, sugar and bacon. Fishing is by far the most important of the occupations of the town, more than 500 steam trawlers being thus engaged. Other industries are shipbuilding, brewing, tanning and the production of soil fertilizers. The government is by mayor, 12 aldermen and 36 councillors. Grimsby is first mentioned in tradition as the place where the Danes landed when they first invaded Britain. It received its first charter from King John in 1201; this was renewed by Henry III (1227, 1271) and James II (1688). Shipping at Grimsby amounted to 1,679,000 tons (1915). Pop. 77,554. Consult Shaw, 'Old Grimsby' (Grimsby 1897).

GRIMSEL (grĭm'zĕl) **PASS.** A mountain pass in the Bernese Alps, leading from Meiringen, canton of Bern, to Obergesteln, canton of Valais. It was in this pass that the French repulsed the Austrians in 1799.

GRIMSTON (Walter Hunter). See KENDAL, WILLIAM HUNTER; KENDAL, MARGARET BRUNTON ROBERTSON.

GRIMTHORPE, Edmund Beckett Denison, LORD, English barrister and author: b. Carlton Hall, Nottinghamshire, England, 12 May 1816; d. 29 April 1905. He took much interest in architecture and designed many churches and houses, but he will be longest remembered for his restorations and rebuildings at Saint Albans Cathedral, works which were carried out at his own expense, but from their iconoclastic character met with almost universal disapproval from architects and excited much discussion both in England and America. His works include 'Origin of the Laws of Nature' (1879); 'A Book on Building' (2d ed., 1880); 'Should the Revised New Testament be Authorized?' (1882); 'Astronomy Without Mathematics' (7th ed., 1883); 'Treatise on Clocks, Watches and Bells' (7th ed., 1883).

GRINDAL, Edmund, English ecclesiastic: b. near Bees, Cumberland, 1519; d. 6 July 1583. He received his Master's degree from Cambridge in 1541 and three years later was ordained deacon in the Anglican church. From 1548–49 he was proctor and Lady Margaret preacher at Pembroke Hall. On the promotion of Ridley to the Bishopric of London, Grindal was made his private chaplain, performing the same office for Edward VI. He was also appointed prebendary of Westminster. After the death of the monarch he journeyed on the Continent, stopping at Strassburg and Frankfurt, where he distinguished himself in his efforts to unite the theories of Cox and Knox. The powers of judgment he manifested and the reputation he acquired secured for him on his return to England the office of Bishop of London. Although a staunch Anglican, he preferred the more lenient method of conciliation to persecution as an effective means for unifying the English church. This policy when applied to the Puritans of the see displeased contemporary prelates and Grindal was accordingly transferred to the Archbishopric of York in 1570. Here the principal non-conformists were Roman Catholics toward whom Grindal had manifested a more active hostility. In 1575 he succeeded Matthew Parker as Archbishop of Canterbury. But it was not long before his lenient measures and attempts to conciliate non-conformists brought down on him the wrath of Elizabeth, who demanded a speedy and thorough submission of all sects to the royal pleasure. Since Grindal failed to comply with her rigorous demands, she had him suspended from his jurisdictional functions (1577) and requested his resignation. Upon his refusal, he was kept from active service for five years, when he apologized and was reinstated. Consult Strype, 'Life of Grindal'

(London 1710); and, for his writings, the Parker Society *Publications* (1853).

GRINDELIA, a plant genus of the Composite family, including about 50 species, indigenous to the United States, Mexico, Central and South America. Some are biennial, others perennial; nearly all bear yellow flowers. Because of the gum exuded by several species they are popularly known as gumweeds or tarweeds. *Grindelia squarrosa* and *G. robusta* contain resin, grindeline and a volatile oil, and are used to a limited extent in medicine because of their diuretic properties. The oil is also used as an embrocation in cases of poisoning from ivy.

GRINDELWALD, grin'dĕl-vält, Switzerland, a valley in Canton Bern, famous as a resort for both summer and winter tourists. A railway connects the town with Interlaken, which is 12 miles distant. A tributary of the Aar River flows through the valley. Glaciers cover the highest points. The valley is situated at 3,402 feet above sea level. Pop. of the village, 3,468.

GRINDING, a mechanical process in which the desired results are produced by frictional abrasion. The term includes also polishing, buffing and lapping. This process is of extensive use in various mechanical arts, as in grinding corn, ores and colors, in which cases the object is to reduce the materials to a fine powder; or in grinding the metals, glass and other hard substances for the purpose of giving them a certain shape, figure, or polish, or a sharp cutting edge. In the first case the grinding is effected by passing the material between rough stones, as in the common flour-mill (see FLOUR) or by a heavy stone or iron cylinder revolving upon a smooth plate. Chicory, chocolate, plumbago for pencils and a variety of other substances are ground by pairs of iron or stone rollers revolving on a slab in such a manner that they not only merely roll but also rub on the surface of the slab. A knife or scraper follows one roller and precedes the other, scooping the paste into the position required to come fairly under the roller which follows it. Colors are ground in small quantities with a muller and slab. The muller is a heavy piece of stone of conical shape, and which rests its base on the slab and is grasped by the hands; the color is mixed to a pasty consistence with the desired medium of oil or water, and rubbed between the two surfaces until smooth and impalpable. The grinding of cutlery and tools is effected by means of the grindstone; glass lenses and metal specula are ground to shape with emery-powder laid on a metal tool. Ornamental glass is ground into facets or otherwise by means of stones and lap-wheels. Diamonds and other precious stones are cut or ground with diamond dust embedded in soft iron. Large flat surfaces are obtained by first working two pieces of the material nearly flat and then laying the one upon the other and grinding their surfaces together with sharp sand, emery or other cutting powder. Plate-glass is flattened in this way; also surfaces of cast-iron, where accurate fitting is required. Sockets and other bearings which require to be fitted with great nicety are usually finished by being ground together with a fine abrasive. For brass or bell-metal pumice-stone is employed in such cases, as emery is apt to embed itself in the metal and give it a permanent abrading action on the bearings. Dry grinding is the term applied to the grinding of steel with dry grindstones. The points of needles and forks are produced by this means, also the finishing of steel pens and the surface of gun barrels. The men and women engaged on this kind of work suffer painfully from irritation of the throat and nostrils caused by the fine, dust-like particles that fly off from the work and float in the air. These difficulties have been mitigated in recent years by the use of mouth-pieces of damp cloth, and the provision of air-blasts to dispose of the dust. The tools which are most commonly employed in grinding are the wheel, the disc and the lap. They may be made either of natural abrasive material, as the grindstone and whetstone, or built up out of crushed abrasives, either natural or artificial, molded into the desired shape with a bond. The wheel has an advantage over the disc, in that the cutting surface moves at a uniform speed, which can be suited exactly to the work in hand: with the disc, the outer edge moves fastest, and the section at the central part very much slower. Grind-stones are run generally so that the cutting face moves at a speed of from 500 to 600 feet per minute for grinding axes and carpenters' tools, and from 800 to 1,000 feet peripheral speed for machinists' tools. For grinding cutlery, speeds of 2,500 to 4,500 feet per minute are not uncommon. Molded grinding wheels are usually run so as to give their peripheral surface a speed of 5,000 to 7,000 feet per minute. A small wheel must obviously make more revolutions than a large one to give an equal cutting effect. For fast cutting, a soft wheel of comparatively coarse grain is used, and is run at a lower speed: in the case of soft steel it is sometimes run as slow as 25 feet per minute. Too high a speed for the work in hand will cause the wheel to glaze, and then to heat. This heat is imparted to the work, and softens it, leading to irregular cutting. Moreover, a glazed wheel is likely to be applied with increased pressure to secure the cut required, and this, with the heating, tends to distortion. It is customary in grinding to use some liquid to increase the efficiency of the tool, and so to reduce the time of operation. Water is used on the common grind-stone. With other abrasives various liquids are employed — lard oil, machine oil, kerosene, gasoline, turpentine, alcohol, soda water, etc.

In disc grinding the abrasive is commonly glued on cloth discs, and these are attached with cement to the face of the metal disc-wheels of the machine. For the finer-grained abrasives paper backing is frequently employed. The speed of a disc grinder is designated by that of the circle at three-fourths of the radius of the revolving disc — outside of this, of course the speed is greater, inside the speed is less. The customary speed for the three-quarter radius ranges from 4,000 to 7,000 feet per minute, according to the work — the slower speeds for wood finishing, the highest for very soft materials, such as artificial rubber, the metals taking the intermediate speeds.

Lapping is a grinding operation between the technical grinding and polishing, and is performed either by wheel-shaped or disc laps. The lap is a piece of soft metal, usually lead into the surface of which has been pressed, usually by rolling, a very fine abrasive, as, for example, diamond dust. After the machine work has been brought by the ordinary methods of grinding to a finish within a few thousandths of an inch, the exact dimension is secured by the lap. The operation is employed chiefly in the accurate finishing of the interior of bores, as for delicate bearings.

Polishing wheels are often of wood covered with leather to which the abrasive is affixed with glue, or they may be made up wheels of solid leather, canvas, or linen discs clamped together. Felt and paper are also used in the same way for special purposes. Wheels for polishing irregular surfaces are made with the outer part pliable so as to follow into cavities readily. Buffing wheels are usually made of cloth, and the abrasive material is applied to them in a mixture of tallow or grease paste.

Sand-jet grinding is a remarkable process, in which abrasion is effected by the percussion of small hard particles on a plain surface. Sharp silicious sand, varying in hardness and fineness according to the kind of work to be done, is employed in most cases. This sand is impelled by a blast of steam or of air. A hole 1½ inch in diameter by 1⅛ deep, has been bored through a solid piece of corundum (the hardest mineral known except the diamond) in 25 minutes by sand driven with steam-power at 300 pounds pressure on the square inch. A diamond has been sensibly reduced in weight, and a topaz altogether dissipated by a sand-jet in one minute. These results are obtained by causing a sand-stream to mix with a steam jet. The sand passes through a central tube, and the steam through an annular tube which surrounds it; a kind of suction acts at the end of the concentric tubes, which draws the sand into the steam jet, and both dash with great force against the stone or other substance to be acted upon, which is placed at about an inch from the mouth of the tube. By the use of flexible jointed connecting tubes the jet can be turned in any direction, and grooves, moldings, letters, etc., can be produced instead of merely straight cuts or cavities. By using an air jet instead of steam, and varying the pressure, a design can be engraved on glass, the parts not to be acted upon being covered with the pattern, made of paper, lace, india-rubber or oil paint. See Abrasives.

Consult Brown & Sharpe Manufacturing Company's 'Construction and Use of Universal Grinding Machines' and 'Cylindrical Grinding' (Providence, R. I. 1914); Colvin, F. H. and Stanley, F. A., 'American Machinist Grinding Book' (New York 1912); Guest, J. J. 'Grinding Machinery' (London 1915); Hamilton, D. T. and Jones, F. D., 'Advanced Grinding Practice' (New York 1915); Woodworth, J. V., 'Grinding and Lapping' (New York 1907).

GRINDLEY, American chemist: b. Champaign, Ill., 13 April 1864. He studied at the University of Illinois and at Harvard. From 1888–89 he was assistant in chemistry at the Illinois Agricultural Experiment Station, and after serving as assistant professor in chemistry at the University of Illinois, became in 1904 professor of general chemistry and director of the chemical laboratory there. Since 1907 he has been professor of animal nutrition. He was appointed director of the investigations of saltpetre in meat (1907–10); member of the Pellagra Commission of Illinois and a member of the commission for the study of problems relating to human nutrition. His principal researches have been along the lines of animal chemistry and nutrition, to which study he has contributed numerous bulletins, reports and articles.

GRINDSTONE, a coarse circular stone erected on a spindle, used for grinding other hard substances, such as steel, glass, stones, etc. They are made generally of siliceous sandstone or manufactured of emery. Carborundum has been found most effective in jewel and glass grinding. Machinery is used to turn the grindstones in the manufacture of cutlery. See Mineral Production of the United States.

GRINDSTONE ISLAND. (1) A small island lying off the southeastern coast of New Brunswick, Canada, at the head of the Bay of Fundy. It has a number of sandstone quarries, from which a fine quality of sandstone is exported, chiefly to the United States, for the manufacture of grindstones. (2) One of the most important of the Magdalen Islands, belonging to Quebec, in the gulf of Saint Lawrence, northeast of New Brunswick.

GRINGOIRE, grăn'gwär', or **GRINGORE, Pierre,** French author: b. Caen, about 1480; d. about 1538. His first works were didactic allegories and mysteries, several of which were produced under commission. At Paris he became a member of the society of "Enfans sans Souci," an association of litterateurs, actors and good-fellows. Gringoire's facility and wit soon won him the leadership of this band, with the title of "Prince des Sots." In his plays are reflected the manners and customs of the times and his hearty burlesque of leaders and political systems brought him to the front as a popular dramatist. Among the best of his plays are 'Le chasteau de labour' (1499); 'Les folles entreprises' (1510); 'La chasse du cerf des cerfs,' a religious poetical satire; 'Le mystère de Saint-Louis' (1525); and, best-known of all, 'Jeu du Prince des Sots et Mère Sotte' ridiculing Julius II. From 1518 until his death, he held the office of herald at the court of Lorraine, and used his pen in the support of the orthodox church. His works were edited at Paris (1858; with additions, 1877). Consult Badel, 'Pierre Gringoire, poète français' (Nancy 1893); Oulmont, 'La poésie morale politique et dramatique à la veille de la Renaissance, Pierre Gringore' (Paris 1911).

GRINNELL, George Bird, American writer and ornithologist: b. Brooklyn, N. Y., 20 Sept. 1849. He received the degree of A.B. at Yale in 1870, and Ph.D. 1880. He was assistant in osteology in the Peabody Museum, New Haven, Conn., 1874–80; was an editor of *Forest and Stream* 1876–1911, and its president from 1879 to 1911. He is a student of American ethnology, and has written about 20 volumes chiefly on Indians and the early West. Among these are 'Pawnee Hero Stories and Folk Tales' (1889); 'Blackfoot Lodge Tales' (1892); 'Story of the Indian' (1895); 'The Indians of To-day' (1900–10); 'The Fighting

Cheyennes' (1915). He founded the Audubon Society in 1886; was appointed commissioner to treat with the Blackfoot and Belknap Indians for the sale of a portion of their lands 1895; and in 1900 set on foot efforts to establish the Glacier National Park in northwestern Montana, which was done in 1910. In 1911 retired from active newspaper work. He is a fellow and member of scientific societies and attached to the American Museum of Natural History.

GRINNELL, Henry, American patron of arctic exploration: b. New Bedford, Mass., 1799; d. New York, 30 June 1874. In 1828 he settled in New York and amassed a fortune in business as a ship-owner. This gave him an opportunity to fit out at his own expense the ship which in 1850 sailed from New York in search of Franklin. He also bore a large part of the expense of Kane's arctic voyage (1853–55), as well as of the later American expedition under the command of Hayes and Hall. In recognition of his services to geographical science the American Geographical Society elected him their president and the coast which stretches to the north of Smith Sound was named Grinnell Land.

GRINNELL, Josiah Bushnell, American clergyman and politician: b. New Haven, Vt., 22 Dec. 1821; d. Marshalltown, Iowa, 31 March 1891. After studying at Auburn Theological Seminary, he entered the Presbyterian ministry and held pastorates successively at Union Village, N. Y., Washington, D. C., and New York. In 1854 he founded the Congregational Church in Grinnell, Iowa, a town named for him, and preached there several years. Later he became known as a wool grower, sat in the Iowa senate 1856–60, and in Congress as a Republican 1863–67. He frequently aided fugitive slaves and at one time a reward was offered for his head on this account by slave-holders. He gave much assistance to Grinnell University, of which he was president, and laid out five Iowa towns. He was the author of 'The Home of the Badgers' (1845); 'Cattle Industries of the United States' (1884).

GRINNELL, Iowa, city in Poweshiek County; on the Chicago, Rock Island and Pacific, and the Minneapolis and Saint Louis Railroads; 115 miles west by north of Davenport. It is the principal trade centre for the county, and manufactures flour, automobiles, washing machines, aeroplanes, liquid soap, gaiters and leggings, carriages, gloves, and some farming implements. It is the seat of Grinnell College, founded in 1848 and under the auspices of the Congregational Church. It contains a Carnegie library. In 1882 the city was nearly swept away by a cyclone. The government is vested in a mayor, elected for two years, and a city council. The waterworks are owned by the city. Grinnell was settled in 1854, incorporated in 1865 and received its city charter in 1882. Pop. 5,061.

GRINNELL, formerly IOWA COLLEGE, Grinnell, Iowa, a coeducational institution founded in 1847 under the auspices of the Congregational Church. Since 1909 the title of Grinnell College has been definitely adopted to avoid confusion with the names of Iowa State University and Iowa State College. Admission is non-sectarian. The faculty numbers 57; the annual attendance of students is over 800; tuition fees are $100; living expenses $250. The total productive funds amount to $1,268,199; annual income, including tuition fees and incidental charges is $227,786. The library contains over 54,000 volumes. The graduates since organization number 2,000.

GRINNELL LAND, a large tract of land in the Arctic Ocean, separated from Greenland by Kennedy and Robeson channels. The northern part of the explored portion is called Grant Land and the southern part Ellesmere Land. The coast is irregular, and the interior is hilly. The climate of the valleys is mild in summer; in many places there is no snow for several weeks, and vegetation grows rapidly. The fox, wolf, musk-ox, ermine, and hare are found in quite large numbers. Lieutenant De Haven, an American, in charge of the Grinnell expedition in search of Sir John Franklin, first saw this land 22 Sept. 1850 and named it after Henry Grinnell (q.v.). Eight months later it was visited by Captain Penny of the British vessel, *Lady Franklin.* He not knowing of the previous visit called the country Prince Albert Land. A British expedition under Nares visited it 25 years after De Haven, Greely in 1881, Lockwood in 1882, and Peary in 1898–99. Consult Sverdrup, 'New Land: Four Years in the Arctic Region' (1904).

GRIPE. (1) A brake applied to the wheel of a crane or derrick; it generally consists of an iron hoop under the control of a lever, and is drawn closely around the wheel to check its motion. (2) As a nautical term: (a) The fore-foot of a ship, on to which the stem is fastened; the forward end of the keel. It is scarfed to the stem piece and false keel, and is secured by a horseshoe or ring to the stem. (b) A broad plait of rope or bars of iron, with lanyard rings and claws, passing over a large boat, and by which it is secured to the ring bolts of the deck. (c) One of a pair of bands passing round a boat near the stem and stern when suspended from the davits, to prevent the boat from swinging about.

GRIPPE. See INFLUENZA.

GRIQUALAND (grē'kwa-lănd) **EAST,** a district of Cape Colony, Africa, lying south of Natal, between Pondoland and Basutoland; area 7,594 square miles. The capital is Kokstad. Pop. about 153,000.

GRIQUALAND WEST, a district of Cape Colony, Africa, bounded north by Bechuanaland, east by the Orange Free States, south by Orange River, and west by Orange River and Bechuanaland; area, 15,197 square miles. It is situated at an elevation of from 3,000 to 4,000 feet, and is noted for its diamond fields which in 1870 began to attract people from other countries. The country was then claimed by the Orange Free State and by Waterboer, the Griqua chief. In 1871 Waterboer ceded all his rights to the British government, and in 1876 the Orange Free State relinquished all claim for the sum of about $440,000. In 1880 Griqualand West was incorporated as a part of Cape Colony. The chief centre of the diamond mining industry is Kimberley (q.v.), the capital. Other towns are De Beers, Beaconsfield, Barkly and Douglas.

GRIQUAS, grē'kwäz, inhabitants of East and West Griqualand, South Africa. They were led by their chiefs, Waterboer and Kok, from the southern part of Cape Province to their present location during the 19th century. Racially, they are a mixture of Dutch and Hottentot peoples.

GRISAR, grē'zär, **Hartmann,** Catholic historian: b. Coblenz, Germany, 1845. He received his education at Münster and Innsbruck. He was ordained to the priesthood in the Society of Jesus in 1868, and taught theology at Innsbruck. His great work on mediæval history 'Geschichte Roms und der Päpste im Mittel-Alter' (1900) has been translated into Italian, French and English. Other works are 'Das Mittel Alter einst und jetzt' (1902) and 'Luther' (1911–12, Eng. trans. 1913).

GRISCOM, Clement Acton, American financier: b. Philadelphia, 1841; d. 1912. He began his career as clerk in the shipping concern of Peter Wright and Sons, and rose eventually to be supervisor and general manager of the International Navigation Company. He was one of the organizers of the International Mercantile Marine Company, of which he was president until 1904, and chairman of the board of directors until 1908. He was also a director in the United States Steel Corporation, and the Pennsylvania Railroad Company.

GRISCOM, John, American educator: b. Hancock's Bridge, Salem County, N. J., 27 Sept. 1774; d. Burlington, N. J., 26 Feb. 1852. After pursuing his studies at the Friends' Academy in Philadelphia, established by William Penn, he took charge of the Friends' monthly meeting school in Burlington, with which he was connected 13 years. In 1807 he removed to New York and began there a career of 25 years as a teacher. In connection with his school he lectured on chemistry with much success. He took a prominent part in the formation of the Society for the Prevention of Pauperism (1817), of which he prepared the constitution and an elaborate first report on the causes and remedies of pauperism. He was an organizer of the Rutgers Medical College, in which he occupied the chair of chemistry and natural philosophy, and after the suspension of the college was widely known as a general lecturer on those subjects. Horace Mann quoted him as one of the eight educational authorities for the changes which Mann planned to introduce into the Massachusetts school system.

GRISCOM, Lloyd Carpenter, American foreign minister: b. Riverton, N. J., 1872. After studying at the University of Pennsylvania and at the New York Law School, he became attached in the capacity of secretary to the United States Embassy in England. Three years after his return, he was elected district-attorney of New York (1897). In the Spanish-American War he rose to the rank of assistant quartermaster. On the cessation of hostilities, he resumed foreign service in the capacity of secretary at Constantinople and Chargé d'Affaires. In 1901 he was appointed Minister to Persia; in 1902, Minister to Japan; in 1906, Ambassador to Brazil, and in 1907 Ambassador to Italy. In 1911 he resumed his law practice in New York city with the firm Beekman, Menken and Griscom.

GRISEBACH, grē'ze-bäH, **August Heinrich Rudolph,** German botanist: b. Hanover 1814; d. 1879. After studying at Göttingen and Berlin, he became in 1847, full professor at the first mentioned university. He travelled in tropical America, and was appointed director of the botanical garden at Göttingen in 1875. Among his works are 'Spicilegium Floræ Rumelicæ' (2 vols., 1843–45); 'Systematische Untersuchungen über die Vegetation der Karaiben' (1857); 'Flora of the British West Indian Islands' (1859–64); 'Die Vegetation der Erde nach ihrer klimatischen Anordnung' (2d ed., 1884).

GRISEBACH, Eduard, German author: b. Göttingsen, 1845; d. 1906. He was the son of August Heinrich Grisebach (q.v.) and received his education at the university in his native city. Entering diplomatic service of Germany, he was chosen to represent that country successively at Smyrna, Bucharest, Saint Petersburg, Milan and Haiti. His poems were collected in 'Der neue Tannhäuser,' which was followed by 'Tannhäuser in Rom.' His works on Chinese literature are 'Die treulose Witive'; 'Kim-Ku-Ki-Kuan: Neue und alte Novellen der Chinesischen Tausendundeine Nacht' (1880); 'Chinesische Novellen' (1884). Other literary productions are his editions of Schopenhauer; and his works on German literature among which are 'Die deutsche Litteratur seit 1770'; and 'Das Goethische Zeitalter der deutschen Dichtung' (1891).

GRISELDA, the heroine of mediæval Italian legends, probably of Provençal origin. In spite of her humble birth, she attracts Walter, marquis of Saluzzo, who marries her. The action of the tale is motivated by the story of Griselda's superiority to all the trials imposed on her love. Boccaccio recites the narrative in the 'Decameron' (about 1350) and on this source Petrarch founded the tale in his Latin letter (1373). It was popularized in many forms subsequently, notably in the drama 'Mystére de Griseldis, marquises de Saluces,' produced at Paris in 1393, by Chaucer in 'Canterbury Tales'; and in 'The Pleasant Comedie of Patient Grissell' (1599) by Dekker, Chettle and Haughton (1603). The story also furnished the theme for ballads and poems and was adapted often in the German, particularly by Hans Sachs (1546). It is found as well in the legends of other European countries. 'The History of Patient Grisel 1619' was edited by Wheatley (London 1885). The course of the story in German and French literatures is traced in Widmann, 'Griseldis in der deutschen Literatur des XIX Jahrhunderts' (Tübingen 1905); and in Schuster, 'Griseldis in der französischen Literatur' (ib. 1909). The ballads may be found in Deloney, 'Garland of Good Will' (1685).

GRISI, grē'zē, **Giulia,** Italian soprano: b. Milan, 1811; d. Berlin, 29 Nov. 1869. She was one of a talented musical family and had a most successful career as dramatic soprano for 30 years. London and Paris were the scenes of her greatest triumphs. She toured America in 1854 with Mario, tenor vocalist, whom she married after divorcing her first husband, Count Melcy.

GRIS-NEZ, grē'-nā, **Cape,** light-house station of France, in the Department of Pas-de-Calais, 21 miles southeast of Dover, England, between Calais and Boulogne.

GRISON, or **HURON**, a weasel-shaped mammal indigenous to Central and South America, having a body about 12 inches long and a tail of equal length. It is gray above the top of the head, back and tail, and is black beneath. When attacked or brought to bay it gives off a fœtid odor similar to that of a skunk. It dwells in rocky clefts, hollow stumps, or holes in the ground.

GRISONS, grē-zôṅ' (German, *Graubünden* or *Bünden*), the largest canton of Switzerland; 90 miles east and west, with a total area of 2,753 square miles. It is a mountainous country, more than 20 Alpine peaks being above 9,000 feet. The population in 1910 was 118,246. The valleys are generally narrow, Upper and Lower Engadine are the broadest. The famous Saint Gotthard tunnel crosses the Alps at the western end of Grisons. It is the home of many famous glaciers, as Todi, Medels, Rhinewald, Bernina, Albula and Silvretta, all lying at elevations above 10,000 feet. The sources of the river Rhine are here, with the valleys of the Upper Rhine, the Middle Rhine and the Hinter Rhine. The famous Inn River also rises in Grisons, flowing northeasterly to the Black Sea. While the Rhine and its tributaries flow northward, some smaller streams drain into the Adriatic. The scenery is of unsurpassed grandeur. Roadways for vehicles have been built through many mountain passes, as San Bernardino, Lukmanier, Splügen, Septimer, Oberalp, etc., all at over 6,000 feet elevation. Among the noted mineral springs frequented by summer visitors are San Bernadino, Saint Moritz, Schulz, Fideris and Le Prese. The territory was formerly known as the canton of Raetia, but by the Napoleonic Act of Mediation in 1803 it became the canton of Grisons in the Swiss confederation. There are a large number of small lakes. Snow rests on the mountains until the last of May and sometimes into late July, but the climate of the valleys is warm or temperate nearly all the year. Agriculture in the valleys and the raising of cattle and sheep on the mountain sides are the chief occupations. Consult Andrea, ‹Das Burgell› (1901); Heierli, ‹Urgeschichte Graubundens mit Anschluss der Romerzeit› (1903). See SWITZERLAND.

GRISWOLD, Alexander Viets, American Protestant Episcopal bishop: b. Simsbury, Hartford County, Conn., 22 April 1766; d. Boston, Mass., 15 Feb. 1843. After studying for the ministry he was ordained in 1795. He was rector of Saint Michael's Church, Bristol, R. I., 1804–30 and of Saint Peter's, Salem, Mass., 1830–35. When what was known as the eastern diocese of the Episcopal Church was organized he was consecrated its first bishop in 1811. He published ‹The Reformation and the Apostolic Office› (1843). Consult Stone, ‹Memoirs of Bishop Griswold› (1844).

GRISWOLD, John Augustus, American manufacturer: b. Nassau, Rensselaer County, N. Y., 1822; d. 1872. At Troy, N. Y., he was active successively in the hardware, drug and iron trades, and established the Albany and Rensselaer Iron and Steel Company. He was a leader in the introduction of Bessemer steel manufacture into the United States, and with C. H. Delamater built the *Monitor* of Civil War fame. He was active in raising troops for the war against Secession, and the Griswold Light Cavalry were named after him. In 1855 he was elected mayor of Troy, in 1863 a Democratic representative in Congress, and subsequently was twice re-elected as a Republican. In 1868 he was nominated for the governorship of New York, but defeated by the Democratic nominee, J. T. Hoffman.

GRISWOLD, Matthew, American jurist: b. Lyme, Conn., 25 March 1714; d. there, 28 April 1799. He studied law and was admitted to the bar in 1743. He became a member of the general assembly in 1751, and member of the governor's council in 1759. While in this relation, he was a champion of the rights of the colonies, and opposed the Stamp Act. Besides being lieutenant-governor of Connecticut 1771–84, he was governor 1784–85 and became judge of the supreme court in 1769. He also presided over the convention which ratified the Federal constitution in January 1788.

GRISWOLD, Putnam, American bass singer: b. Minneapolis, Minn., 1875; d. 26 Feb. 1914. He studied with Randegger at London; with Bouhy at Paris, with Stockhausen at Frankfort; and with Emerich at Berlin. His principal rôles were in Wagnerian Opera, in which he starred at the Berlin Opera and at the Metropolitan in New York City. For his splendid renderings he was decorated by the Emperor Wilhelm on two occasions.

GRISWOLD, Roger, American politician: b. Lyme, Conn., 21 May 1762; d. Norwich, Conn., 25 Oct. 1812. He was graduated from Yale College in 1780, and afterward studied and entered on the practice of law. He was a member of Congress, 1795–1805, and became judge of the Connecticut supreme court in 1807. President Adams offered him the portfolio of Secretary of War in 1801, but he declined. He was lieutenant-governor of his native State, 1809–11, and governor 1811–13. He did not live to finish his term of office. He was a son of Matthew Griswold (q.v.).

GRISWOLD, Rufus Wilmot, American author and compiler: b. Benson, Rutland County, Vt., 15 Feb. 1815; d. in New York, 27 Aug. 1857. He was apprenticed to the printing trade, but afterward studied divinity and became a preacher in the Baptist church. He soon became associated in the editorship of literary periodicals in Boston, New York and Philadelphia, among which were the *New Yorker*, *Brother Jonathan* and the *New World*. In 1842–43 he edited *Graham's Magazine* in Philadelphia, to which he attracted contributions from some of the best writers in the country, and in 1850 projected the *International Magazine* published in New York, and edited by him till April 1852. The works by which he is chiefly known are collections of specimens from American authors, accompanied by memoirs and critical remarks. His work in this field did much to encourage young writers and to stimulate interest in American literature. His published works include ‹Poets and Poetry of America› (1842); ‹Prose Writers of America› (1846); ‹Female Poets of America› (1849); ‹Sacred Poets of England and America› (1849); ‹Poets and Poetry of England in the Nineteenth Century› (4th ed. 1854); ‹Curiosities in American Literature›; ‹Washington and the Generals of the American Revolution,› with Simms, Ingraham and others (1847); ‘Napoleon and the Marshals of the Empire,’ with Wallace (1847); ‘Republican Court, or American Society in the Days of Washington’ (1854). He edited the first American edition of the prose works of Milton (1845), and was one of the editors of the works of Edgar A. Poe, his ‘Memoir’ to which aroused much controversy. His correspondence, published by his son, W. M. Griswold, (Cambridge, Mass., 1898) is of importance in the history of American literature.

GRISWOLD, Conn., town in New London County; on the New York, New Haven and Hartford Railroad, 10 miles northeast of Norwich. Agriculture and dairying are the chief occupations of the neighborhood. Pop. 4,250.

GRISWOLDVILLE, Battle of. When General Sherman marched from Atlanta to the sea, his right wing, commanded by General Howard, was under instructions to threaten Macon and strike the Savannah Railroad at Gordon, about 20 miles east. Upon his arrival at Clinton, the cavalry advance made a demonstration on Macon, and 21 Nov. 1864, his entire cavalry force took up an advanced position covering all the roads to Macon, and that day and the next all the troops and trains were closed up toward Gordon, except C. R. Woods' division, which was directed to take up a strong position on the Irwinton road and demonstrate on Macon and Griswoldville, eight miles east. The demonstration was made on the 22d by Walcutt's brigade of 1,513 men and two guns, in co-operation with Kilpatrick's cavalry on the different roads. Some of Kilpatrick's cavalry were in advance of Walcutt and were fiercely attacked by Wheeler; but with Walcutt's assistance Wheeler was driven from the field, and followed by Walcutt beyond Griswoldville. Walcutt was then recalled to a position a little east of Griswoldville, where two miles in advance of his position, he formed line along a slight rise of ground, with his flanks well protected by swampy ground, and with an open field in front. Kilpatrick's cavalry was on either flank. Walcutt had scarcely thrown up a rail barricade, in view of another attack of Wheeler's cavalry, when he was fiercely assailed by infantry. That morning, under General Hardee's order, Gen. G. W. Smith, in command of a considerable body of Georgia militia that had been concentrated at Macon, directed General Phillips, with a division of infantry and a battery, to march from Macon to Gordon and take trains for Augusta. Phillips had been instructed to halt before reaching Griswoldville and wait for further orders, and was cautioned not to engage an enemy if met, but to fall back to the fortifications at Macon. But when he heard of Walcutt's position he moved through Griswoldville and, with more courage than discretion, threw his four brigades against Walcutt, at the same time opening destructively with his artillery. At 2 o'clock, in three compact lines, his militia charged to within 75 yards of Walcutt's line, and were repulsed. The assaults were repeated in front and on both flanks, and continued until sunset, when, everywhere repulsed, he abandoned the field, leaving his dead and wounded. During the action Walcutt was severely wounded by a piece of shell. The Union loss was 13 killed, 69 wounded, and 2 missing. The Confederate loss was 51 killed and 472 wounded. Consult ‘Official Records’ (Vol. XLIV); Cox, ‘The March to the Sea’; the Century Company's ‘Battles and Leaders of the Civil War’ (Vol. IV).

GRIVET. See Green Monkeys.

GRIZZLY BEAR. See Bear.

GROAT (from Dutch *groot,* great), any large or thick coin of the Middle Ages in Europe. It was usually made of silver and varied greatly in value from time to time. In England it appeared in 1351 and was once worth fourpence. The German word «groschen» is of the same origin. In the second half of the 14th century the groat was coined in Scotland; and in the 15th century in Ireland.

GRÖBEN, grė'bĕn, **Otto Friedrich von der,** German author: b. Prussia, 1657; d. 1728. He traveled in Italy, the Orient and Western Africa, where he founded Fort Grossfriedrichsburg on the coast of Guinea. He served as major-general in the wars of Poland and Venice against the Turks. His publications include ‘Orientalische Reisebeschreibung . . . nach Guinea und der Verrichtung zu Morea’ (1694); and ‘Eine Geschichte des Lebens und der Liebe von Bergonnen und der tugendhafte Areta’ (Dantzig 1700).

GRÖBER, grė'bĕr, **Gustav,** German scholar and author: b. Leipzig, 1844; d. 1911. He received his education at Leipzig, taught at Zurich (1871–74), and later became professor at Breslau and the University of Strassburg. His principal work has been in romance literature and linguistics. In the interests of this study he edited ‘Zeitschrift für romanische Philologie’ (1877) and ‘Grundniss der romanischen Philologie’ (2d ed., Vol. I, Strassburg 1904–06). Among his other works are ‘Die handschriftlichen Gestaltungen der Chanson de Geste von Fierabras’ (1869); ‘Die altfranzösichen Romanzen und Pastourellen’ (Zurich 1872); ‘Carmina Clericorum’ (7th ed., 1890); ‘Abriss der französischen Litteratur des Mittelalters’ (1897).

GROCYN, grō'sĭn, **William,** English classicist: b. Wiltshire, about 1446; d. 1519. He was trained for the church at Winchester College and at New College, Oxford, where he received a fellowship in 1467. After occupying several pastorates, he became prebendary at Lincoln Cathedral (1485). In 1488 he undertook a journey to Italy, where he spent several years in the study of classic languages and literature under Chalcondylas and Poliziano. On his return in 1491 he was appointed lecturer at Exeter College, and later taught Greek at Oxford. He numbered among his friends, More, Linacre, Colet and Erasmus. The only surviving literary fragments of Grocyn are a few lines of verse about a lady who threw a snowball at him, and a letter to Aldus Manutius at the beginning of Linacre's translation of Proclus's ‘Sphæra’ (Venice 1499). Consult Burrows, ‘Collectanea’ (Oxford Historical Society, Vol. II, 1890).

GRODEK, Galicia, town about 20 miles southwest of Lemberg, containing several large tanneries. Flax and wheat are grown extensively in the neighborhood and are important items in the trade of the town. In 1914 the town was occupied by the Russians during their advance in Galicia but was liberated the following summer when the German general von Mackensen reconquered Galicia. Pop. 79,592, chiefly German colonists, including also some Jews.

GRODNO, grôd'nô', a government of Russian Poland, area 14,896 square miles, mostly forest and swamp, with a population of 2,048,200. The capital, bearing the same name, is an important fortress on the River Niemen and was formerly a Polish capital. Situated about 160 miles northeast of Warsaw, the town had a population before the war of 63,000. It was built in the 12th century, was sacked by the Mongols in 1241 and again by the Teutonic Knights in 1284 and 1391. The treaty providing for the second partition of Poland was signed here in 1793, reducing the old kingdom to one-third of its original size. The western portion, including Thorn and Danzig, fell to Prussia. The town is poorly built, its industries consist mainly of silk, linen and woolen manufactures, and small arms factories. The principal building is a palace built by Alexander III. During the first year of the European War Poland was the scene of terrific fighting between Russians and Germans. After the fall of Warsaw, Ivangorod, Novo Georgievsk and Kovno in August 1915 the Russian army was in retreat through Kovno, Grodno and Bialystok. Olita was evacuated and Grodno, the last of the Niemen fortresses, became the point of a salient too dangerous for the Russians to hold. The Germans stormed the western works on 1 Sept. 1915, and three days later they were in possession of the town and fortress, taking 2,000 prisoners. See WAR, EUROPEAN — EASTERN FRONT.

GROEN VAN PRINSTERER, groon van prin'stār-ār, **Guillaume,** Dutch historian: b. Voorburg, 21 Aug. 1801; d. The Hague, 19 May 1876. After studying at Leyden he became secretary to King William I of Holland and leader of the anti-revolutionary party of the House of Deputies, where he was active from 1840 to 1865. His most important work is his edition of 'Archives, ou correspondance de la Maison d' Orange-Nassau' (12 vols, 1835–61). Others are 'Handboek der geschiedenis van het Vaderland' (1841–46); 'Bijdrage tot de herziening der grondwet in nederlandschen zin' (1840); 'Ongeloof en revolutie' (2d ed., 1868); 'De Nederlander' (1850–55); 'La Prusse et les Pays-Bas' (1867); and 'Maurice et Barnevelt' (1875). Consult Vos, 'Groen van Prinsterer en zijn tijd' (2 vols., Dordrecht 1886–91).

GROESBECK, groos'bĕk, **William Slocomb,** American politician: b. New York, 1815; d. 1897. He was graduated from Miami University, Oxford, Ohio, in 1835, studied law and began practice at Cincinnati. In 1851 he was a member of the Ohio State constitutional convention, and in 1852 a member of the commission appointed for the codification of the State laws. From 1857 to 1859 he was a Democratic representative in Congress, member of the Peace Congress in 1861, delegate to the Union national convention in Philadelphia in 1866, in 1872 was nominated for the presidency by the Liberal Republicans but met no recognition in the ensuing campaign, and in 1878 was United States delegate to the International Monetary Congress at Paris. He defended Andren Johnson in the latter's impeachment trial (1868).

GROGAN, Ewart Scott, British military officer: b. Winchester, 1874. After receiving his education at Jesus College, Cambridge, he went to Africa (1895–97) and served in the second Matabele War. From 1897–1900 he journeyed across Africa with Arthur Sharp. He rose to the rank of captain of the Fourth Royal Munster Fusiliers. An account of his African travels was published under the title 'From Cape to Cairo' (1900). He wrote also 'The Economic Calculus' (1909); 'Tariff: the Workers' Charter,' besides numerous shorter articles on his travels which carried him to Australasia, the countries of the South Pacific and of North and South America.

GROIN, the region where the front of the thigh joins the body. The abdominal muscles end below in a strong tendon which makes a fold across the front of the bony pelvis. The large nerves, arteries and veins pass through folds of this ligament, and portions of the abdominal contents in case of rupture pass into the scrotum or form a tumorous swelling in the groin.

GROLIER DE SERVIÈRES, grō'lyā' de sār-vyār', VISCOUNT D'AGUISY, French book-collector: b. Lyons, 1479; d. Paris, 1565. He spent several years in Italy in the foreign diplomatic service of France. In 1537 he became treasurer for Francis I. During his life he collected some 3,000 volumes, many of them rare and curious works. This library was sold at the end of the 18th century, the National Library at Paris possessing a considerable number. The Grolier Club (q.v.) of New York, a society of bibliophiles, has been named in his honor. He also promoted the art of artistic book-binding.

GROLIER CLUB, an association of book-lovers, established in New York city, 1884. It takes name from Jean Grolier de Servières (q.v.), and its purpose is the promotion of the study of literature, book-collecting and the art of book-making. It maintains a clubhouse, and a rare library; and has edited and published numerous valuable bibliographical and historical works.

GROLL, Albert Lorey, American painter: b. New York, 1866. He studied at Munich under Gysisand Loefftz. Most of his work has been of landscape of the western country of the United States. Among the best of them are 'No Man's Land' (Corcoran Gallery, Washington); 'California Redwoods' (Brooklyn Institute); 'Acoma Valley, New Mexico' (National Gallery, Washington). He has won several prizes for his paintings, and was elected a member of the National Academy in 1910.

GROMWELL, a plant genus (*Lithospernaum*) of the Boraginaceæ family, comprising about 40 species of which about 10 are found in the temperate regions of the United States. These plants were formerly in great repute as medicinal plants but at present are of little use, except those species which have perennial roots from which a red dye is extracted.

GRONINGEN, the most northerly province of the Kingdom of the Netherlands, bounded north by the North Sea, east by Hanover, south by the province of Drenthe, and west by Friesland. Its area is 896 square miles. It is watered by the Hunse, navigable for large vessels from the town of Groningen to its mouth in the Lauwers Zee, and by other small streams, and by lakes and numerous canals. Its surface is flat, protected against the sea on the north by dykes. The soil principally alluvium, forms excellent arable land. The north of the province contains the best soil, and is one of the most densely peopled districts of the kingdom. Much of the land towards the southeast is marshy, and lies in pasturage, which supports a fine breed of cattle, and great numbers of highly valued horses and sheep. Farming and grazing are the chief pursuits of the people; fishing, commerce, and trade also are carried on, and some manufactures. Shipbuilding is extensive and much butter is exported. The people are almost entirely of the Frisian race, and belong to the Reformed Church. Pop. 336,741. The capital is Groningen (q.v.).

GRONINGEN, Holland, an important town and capital of the province of the same name, at the confluence of the Aa and the Hunse, 22 miles west of Dollart Bay. It is an important railway centre and is traversed by numerous canals crossed by 18 bridges. The great market-place is 662 feet long and 389 feet broad, and contains the beautiful Gothic church of Saint Martin's, with a tower 343 feet high. The university, founded in 1614, is housed in a splendid group of buildings, erected since 1906. The port is connected by canals with Dollart Bay and with the Lauwers Zee and the Zuyder Zee. The ancient walls and ramparts have been converted into promenades. Industrial establishments include sugar and textile factories, gold and silver ware, cigar and tobacco factories, shipyards, paper mills, etc. In 1040 the town was granted to the Bishop of Utrecht; in 1282 it became a member of the Hanseatic League; was captured by Maurice of Nassau and became part of the United Netherlands in 1594. Pop. 78,276.

GRONLUND, grōn'lŭnd, **Lawrence,** American socialist: b. Denmark, 1847; d. 1899. He studied in the University of Copenhagen, in 1867 came to the United States, practised law for a time, but became a writer and speaker on socialism. Among his publications are 'The Coming Revolution' (1880), a forecast of the peaceful change which he believed might be effected by a national organization operating in every community; 'Ça Ira,' a rehabilitation of Danton (1888); and 'The New Economy' (1898).

GRONNA, Asle J., American politician: b. Elkader, Clayton County, Iowa, 10 Dec. 1858. After engaging in farming and banking in the Dakotas for many years, he was elected to the Territorial Legislature of North Dakota in 1889. He sat in Congress from 1905–11, in which year he was chosen to fill the vacancy in the United States Senate left by the death of Martin N. Johnson. He was re-elected for the term 1915–21.

GRONOVIUS, grō-nō'vĭ-ŭs (properly GRONOV, grō'nōv), the name of several Dutch classical scholars: (1) JOHANN FRIEDRICH: b. Hamburg, 8 Sept. 1611; d. Leyden, 28 Dec. 1671. He studied at Leipzig and Jena, and law at Altdorf, was appointed professor of history and eloquence at Deventer (1642), and, after the death of Heinius, succeeded him as professor of *belles-lettres* at Leyden (1658). His editions of Livy, Statius, Justin, Tacitus, Aulus Gellius, Phædrus, Seneca, Sallust, Cicero, Terence, Pliny and Plautus, 'Observationes' (1639), and edition of Hugo Grotius' work, 'De Jure Belli et Pacis' (1642) are justly valued on account of the notes. (2) JAKOB, son of the preceding: b. Deventer, 1645; d. Leyden, 21 Oct. 1716. He studied at Deventer and Leyden, and published, in 1676, an edition of Polybius, which met with great favor. He received from the Grand Duke of Tuscany a professorship at Pisa, which he relinquished in 1679 to become professor of Greek literature and history at Leyden. This learned critic edited Tacitus, Polybius, Herodotus, Pomponius Mela, Cicero, Ammianus Marcellinus and other classical writers, and compiled the valuable 'Thesaurus Antiquitatum Græcarum' (1698–1702). He also promoted the publication of the collections of Grævius. He was a violent controversialist.

GROOS, grōs, **Karl,** German psychologist: b. Heidelberg, 1861. After receiving his degree from Heidelberg he taught at Giessen, Basel, and was appointed professor at Tübingen. His principal studies have been made in child psychology. His 'Spiele der Tiere' (1896) and 'Die Spiele der Menschen' have been translated into English under the titles 'The Play of Animals' and 'The Play of Man,' with a preface by Baldwin. Other works are 'Die reine Vernunftwissenschaft' (1889); 'Einleitung in die Aesthetik' (1892); 'Der ästhetische Genuss' (1902); 'Das Seelenleben des Kindes' (1903); 'Die Befreiung der Seele' (1909); 'Der Lebenswert des Spieles' (1910).

GROOT, grōt, **GROETE,** or **GROOTE, Gerhard** or **Gerardus,** founder of the Brothers of the Common Life (q.v.): b. Deventer, 1340; d. there, 20 Aug. 1384. Educated at Paris, he there became a teacher, later took deacon's orders and was successful as a traveling preacher. He advocated general reading of the Scriptures, assembled a company for the preparation of copies of the Bible and thus began the formation of the Brothers of the Common Life. To this order, which obtained papal sanction in 1418, belonged Thomas à Kempis (q.v.). Groot was the author of several works.

GROOT, Jan Jakob Maria de, Dutch Orientalist: b. Schiedam, 1854. He studied at Leyden and then embarked for the Dutch colonies in the capacity of Chinese interpreter. On his return he was appointed professor of Chinese at Leyden and in 1911 at Berlin. His publications include 'The Religious System of China' (1892–1910) and 'Religion in China' (1913).

GROS, grō, **Antoine-Jean,** BARON, French historical painter: b. Paris, 16 March 1771; d. near Paris, 26 June 1835. At 14 he became a pupil of David, and in 1794 left Paris for Rome. His means, however, were not sufficient for the journey, and he had to depend on what he could earn as a portrait-painter in the various towns he passed through. At Genoa, in 1796, he was drawn for the French army, and soon became a staff-officer. Josephine, afterward empress of France, saw and admired several portraits bv the young officer, and he was called upon to paint that of Bonaparte. The result was a picture representing Napoleon leading his troops over the bridge of Arcola. In 1804 he produced his ‘Peste de Jaffa,’ considered by many to be his masterpiece. He painted the ‘Bataille d'Aboukir’ (1806); ‘Bataille d'Eylau’ (1808); ‘La Prise de Madrid,’ ‘Wagram,’ and ‘La Bataille des Pyramides’ (1810). In 1816 he was made member of the Institute and professor in the Ecole des Beaux-Arts and became officer of the Legion of Honor in 1828. In France his chief work is considered by some to be the cupola of Saint Geneviève at Paris, exhibiting the saint protecting the throne of France, represented by Clovis, Charlemagne, Saint Louis and Louis XVIII. This picture covers an immense space, and is correct in design but defective in color and expression. The artist received for it 100,000 francs and the title of baron. The rise of the romantic school bore away from him the tide of popularity, and his last work ‘Hercule et Diomède,’ was a failure. Adverse criticisms upon it brought on a fit of despondency and he drowned himself in the Seine. His art bridges the chasm between the classicism of David and the art of the Romantic school. He was the first to take up historical subjects in preference to classic subjects. His best works are in the Louvre and the Museum of Versailles. His ‘Francis I and Charles V at St. Denis,’ now in the Louvre, he considered his best work in color. A great number of his portraits in the Versailles gallery are characteristic and powerful; notable among them are those of Masséna, Lasalle and Fournier-Sarlovese. Consult Chesneau. ‘Les chefs d'École’ (Paris 1883); Delacroix in the *Revue des Deux Mondes* (1848); Delestre, ‘Jean Gros’ (Paris 1867); and other biographies by Tripier le Franc (1880), Dargenty (1887) and Lemonnier (1912).

GROS VENTRES, grō vāntr (Fr. big bellies”). (1) The Minnetari or Hidatsa Indians, on the Missouri River. (2) A band of the Arapaho, who separated from the main body about 1800: the name was a misunderstanding of their own term, which meant “hungry men” or “beggars.” After conflicts with the Sioux, and being plundered by the Crows, whom they had joined, they settled among the Blackfeet near Milk River about 1824; prospered, and were very hostile to the whites. About 1830 they had some 400 lodges and 3,000 souls. But about 1866 they were decimated by the measles, and thus weakened, received a terrible defeat from the Piegans; reduced to about 1,300 by smallpox, in 1870, they were plundered and many killed by the Sioux. Later they were joined by the main body of Arapaho and Cheyennes. They are now settled among the Blackfeet in Montana.

GROSART, Alexander Balloch, Scottish editor: b. Stirling, Scotland, 18 June 1827; d. 1899. He studied at Edinburgh University and received ordination in the Presbyterian Church. In 1856 he was minister at Kinross, and after several years at Liverpool (1865–69) was called to the pastorate at Blackburn, Lancashire, where he remained until his resignation in 1892. His principal achievement was the editing and reprinting of many old Elizabethan and post-Elizabethan authors. These include a series of Puritan writers such as Richard Sibbes, Thomas Brooks, Herbert Palmer and Richard Gilpin. From 1868 to 1876 he published the ‘Fuller Worthies' Library,’ then began the ‘Chertsey Worthies' Library,’ which he completed in 1881. ‘The Huth Library’ followed. Among the authors whom he presented to his subscribers were Thomas Fuller, Sir John Davies, Fulke Greville, Henry Vaughan, Andrew Marvell, George Herbert, Richard Crashaw, John Donne, Sir Philip Sidney, Cowley, Henry More, John Davies, Dr. J. Beaumont, Robert Greene, Thomas Nash, Gabriel Harvey, the prose extracts of Thomas Dekker and Edmund Spenser. English literature owes him a great debt for having unearthed and preserved for study much valuable literary material.

GROSBEAK, grōs'bēk, any of various birds whose beaks seem disproportionately large. They are mainly finches such as the hawfinch and bullfinch in Europe, and their relatives in the Orient. Bird-dealers call “grosbeaks” a great number of African, Asiatic and American line cage-birds, some of which are weaver-birds, or tanagers, etc. The term is more exactly given to certain North American fringilline birds with big swollen bills, such as the cardinal (q.v.), the evening grosbeak (q.v.), and the pine, blue, rose-breasted and black-headed grosbeaks. The pine grosbeak (*Pinicola enucleator*) is a greenish yellow finch which dwells exclusively in the coniferous forests of northern Europe and America, and is only seen in the United States when forced southward by hard winters; it feeds on the seeds of the pine, spruce, etc., wrenching open the cones with its powerful beak. The blue grosbeak (*Guiraca cærulea*) is a large, richly blue southern and western bird, nearly related to the indigo-finch, which makes its nest in a bush, and lays pale blue eggs, wholly unmarked. The rose-breasted and black-headed grosbeaks represent the genus *Zamelodia,* the former (*Z. ludoviciana*) in the Eastern States, and the latter (*Z. melanocephala*) in the Rocky Mountain region. Both are birds of brushy places, making large, rude nests in bushes and laying greenish, heavily marked eggs; and in the breeding-season both are among the loudest and most brilliant of American song-birds. As in nearly all the grosbeaks the females of these species are inconspicuous in brown tints, while the males are dressed in gay colors. The male rose-breasted has the head, neck and upper parts mostly black, with the rump, wings, tail and abdomen, white; while the breast and lining of the bend of the wing are exquisite rose-red, which the bird is fond of displaying. The male blackhead has a wholly black head and upper parts, set off by a collar and other marks of dull orange, which color also suffuses the whole lower parts.

GROSCHEN. See GROAT.

GROSE, Francis, English antiquarian: b. Middlesex, 1731; d. Dublin, 1791. He received a good education and was trained for draughtsman. He first secured a position in the College of Heralds, and later became paymaster in the Hampshire militia. Having squandered his patrimony by his generous and careless habits, he found himself left to his own resources to gain a living. Accordingly, he revived his interest in antiquities and began to publish the results of his study and research. Besides these serious works, his publications include several humorous travesties. For Grose was above all a popular fellow, with an abundance of wit, good humor and generosity. He was the author of 'Antiquities of England and Wales' (1773); 'Antiquities of Scotland' (2 vols., 1789–91); Antiquities of Ireland' (2 vols., 1791); 'A Treatise on Ancient Armour and Weapons' (1785–89); 'Military Antiquities' (2 vols., 1786–88); 'A Classical Dictionary of the Vulgar Tongue' (1785); 'Advice to Officers of the British Army' (1782); 'Rules for Drawing Caricatures' (1788); 'The Grumbler' (1791).

GROSE, George Richmond, American Methodist Episcopal clergyman: b. Nicholas County, W. Va., 1869. He studied at the Ohio Wesleyan University and at the Boston University School of Theology, receiving the degree of D.D. from the first-named institution in 1908. He was pastor at Leicester, Mass. (1894–99); at Jamaica Plain, Boston (1897–1900); Newton, Mass. (1900–05); Lynn (1905–08), and of Grace Church, Baltimore (1908–13). He has been president of De Pauw University since 1913, and lectured at Johns Hopkins University from 1910–13. He has published 'The Outlook for Religion' (1913); 'Religion and the Mind' (1915).

GROSE, William, American soldier and politician: b. Dayton, Ohio, 1812; d. 1900. He resigned his position as judge of the Court of Common Pleas in 1861 to recruit and take command of the 36th Indiana regiment of infantry, and commanded a brigade in the battles of Murfreesboro, Chickamauga and Chattanooga. He was commissioned a brigadier-general 30 July 1864 and at the battle of Nashville, 15 and 16 Dec. 1864, he commanded the Third brigade in General Thomas' army. In 1865 he was brevetted major-general of volunteers. He was State senator from 1879 to 1883.

GROSEILLERS, Médard Chouart, Sieur de, Franco-American trader and explorer: b. Charly-Saint Cyr, near Meaux, 1621; d. about 1684. He came to Canada and soon earned the reputation of an intrepid explorer. He was a brother-in-law of the equally famous Radisson. The two formed an expedition and set out for Lake Nipissing in 1658 and spent the winter at Green Bay. Before the spring of 1659 their Indian guides led them across what is now Wisconsin as far as the upper Mississippi, thus discovering the great Northwest. Late in the spring they continued their westward journey between the Mississippi and the Missouri, visited the Sioux, and learned of the Crees and other tribes to the westward and even of the Spaniards to the far south. To just what point this westward journey lay is to-day a matter of conjecture. Their journey homeward to Quebec was beset with many dangers, the Iroquois being on the warpath. A second trip to the Northwest was made in 1661 for fur-trading purposes. Difficulties with the governor of New France led to the fining and imprisonment of Groseillers on his return in 1663. Groseillers went to France to seek reparation, but nothing was done. He hurried back to Three Rivers in 1664, thence with Radisson he took secret passage to Isle Percée, where he had been told a ship would be sent from La Rochelle. Disgusted with the treatment accorded them, they resolved to leave the country and departed for Port Royal, Nova Scotia. Groseillers and his brother-in-law are next heard of in Boston trying to get a ship for an expedition to Hudson's Bay. On a voyage to England they were set upon by a Dutch cruiser, were captured and landed in Spain. In 1666 they reached London, and in 1667 were received at Windsor by King Charles. After much delay Prince Rupert financed another expedition for the intrepid Frenchmen, and a year, 1668–69, was spent on a trading expedition. The success of the voyage brought about the formation of a fur company which in 1670 was chartered as the Hudson's Bay Company. After being accused of double-dealing Groseillers retired for a time to Three Rivers, but was soon summoned by Radisson to join an expedition of private French interests to the Hayes River in 1681–82. His latter days were embittered by the jealousy of other traders and by numerous lawsuits. His petition to the French court for redress of his wrongs was ignored and at length he gave up the struggle and retired to Three Rivers.

GROSS, grōs, **Charles,** American historian: b. Troy, N. Y., 10 Feb. 1857; d. 1909. After graduating from Williams College in 1878, he pursued his studies at Göttingen, and was engaged in literary work in England 1884–87. In 1888 he was made instructor and professor of history at Harvard University. A frequent contributor to the *American Historical Review* and other historical journals, he has published 'Gilda Mercatoria' (1883); 'The Exchequer of the Jews of England in the Middle Ages' (1887); 'The Gild Merchant' (1890); 'Select Cases from the Coroner's Rolls' (1896); 'Bibliography of British Municipal History' (1897); 'Sources and Literature of English History' (1900); 'The Court of Piepowder' (1906). In addition he has translated Lavisse's 'Political History of Europe' (1891); Kayserling's 'Christopher Columbus' (1893).

GROSS, Ferdinand, Austrian journalist and author: b. Vienna, 1849; d. 1900. After studying at Vienna, he undertook journalistic work and became in 1879 the editor of the *Frankfurter Zeitung*. He resigned this post in 1881, to become editor of the *Wiener Frendenblatt*, in which capacity he remained five years. He also edited the *Wiener Mode*. His published works include essays and sketches collected under the titles 'Kleine Münze' (1878); 'Oberammergau Passionsbriefe' (1880); 'Mit dem Bleistift' (1881); 'Aus der Bücherei' (1883); 'Blätter im Winde' (1884); 'Literarische Modelle' (1887); 'Goethes Werther in Frankreich' (1888); 'In Lachen und Lächeln' (1898); 'Von der leichten Seite' (1900); and several dramas, 'Die neuen Journalisten' (with Max Nordau 1880); 'Der erste Brief' (1883).

GROSS, Samuel D., American physician and surgeon: b. Northampton County, Pa., 8 July 1805; d. 6 May 1884. He was graduated from Jefferson Medical College, Philadelphia, in 1828, and began the practice of medicine in Philadelphia, devoting his leisure to study and to the translation of French and German medical works. His first original work was a treatise on the ‘Diseases and Injuries of the Bones and Joints’ (1830), in which occurs the first account of the use of adhesive plaster as a means of extension in the treatment of fractures. In 1835 he became professor of pathological anatomy in the medical department of the Cincinnati college, where he delivered the first systematic course of lectures on morbid anatomy that had ever been given in this country, and composed the first systematic treatise upon the subject ever published in the United States, ‘Elements of Pathological Anatomy’ (1839). In 1840 he became professor of surgery in the University of Louisville, from 1850 to 1856 in the University of New York and in Jefferson Medical College from 1856 to 1884. He was president of the American Medical Association and the American Surgical Association in 1868 and 1880, respectively. Besides the works already mentioned, he was the author of a monograph on ‘Wounds of the Intestines’ (1843); ‘Diseases, Injuries and Malformations of the Urinary Organs’ (1851); ‘Foreign Bodies in the Air Passages’ (1854); ‘System of Surgery, Pathological, Diagnostic, Therapeutic and Operative’ (2 vols., 1859; 6th ed., 1884).

GROSS, William Hickley, American archbishop: b. Baltimore, Md., 1837; d. 1898. After receiving his training at Saint Joseph's College, he was ordained in the Redemptorist order (1857). In 1871 he became superior of the order. In 1873 he succeeded to the bishopric at Savannah, Ga., and 11 years later was appointed archbishop of Oregon.

GROSSCUP, Peter Stenger, American lawyer: b. Ashland, Ohio, 15 Feb. 1852. He was graduated at Wittenberg College in 1872 and two years later completed the course at the Boston Law School. He began practising in his native town where he also served in the capacity of city solicitor for six years. From 1892–99 he was United States District Judge for the northern district of Illinois, in which year he accepted the office of judge of the United States Circuit Court of Appeals for the seventh circuit, maintaining this position until 1905. Of this court he became presiding judge in 1905, resigning in 1911; since when he has resumed his law practice at Chicago.

GROSSE, Julius Waldemar, German poet, dramatist and novelist: b. Erfurt, Prussia, 25 April 1828; d. 1902. After obtaining his education at Halle he studied law, painting and then turned to poetry; later he entered the field of journalism, for 16 years (1854–70), being associated with the *Neue Münchener Zeitung* (afterward known as the *Bayrische Zeitung*), and in 1870 becoming secretary of the Schiller-Stiftung, at Weimar. His writings are various, including novels, dramas, epics, songs and ballads, the most important of which are his war songs ‘Wider Frankreisch’ (1870); ‘Das Volkramslied’ (1889); ‘Gundel von Königssee’ and ‘Das Mädchen von Capri,’ all epic poems; ‘Pesach Pardel’ (1871); ‘Hilpah und Shalum’ and ‘Der Wasunger Not’ (1872), comic epics; the dramas, ‘Tiberius’ (1875) and ‘Fortunat’ (1895); the novels ‘Ein Revolutionär’ (2d ed., 1871) and ‘Tante Carldora’ and several tales and romances, among which is ‘Die Novellen des Architekten’ (1896).

GROSSE ISLE, Canada, a small island in the Saint Lawrence River, 30 miles south of Quebec. It is about two and one-half miles long and one mile wide and is used as the quarantine station for the province.

GROSSENHAIN, grŏs'sĕn-hīn, Germany, a town in Saxony, on the Röder River, 20 miles northwest of Dresden. The principal industries include the manufacture of silks, woolens, machinery, cigars, leather, cut glass, copper and zinc utensils, lumber, bricks, soap and gardening. There is also a trade school, a library, a public park and a gymnasium. Pop. 12,250.

GROSSETESTE, Robert, English Roman Catholic prelate: b. Stradbrook, Suffolk, about 1175; d. Buckden, 9 Oct. 1253. He studied law, physics and theology at Oxford and Paris and upon his return to England attained an enviable reputation as a theologian, so much so that in 1214 he became archdeacon of Wifts and in 1224 received the directorate of theology and became first *rector scholarum* of the Franciscan school at Oxford. In 1232 he took up the cause of the Jews against the king, defending them with great vigor and in 1235 was elected bishop of Lincoln, whereupon he undertook to make radical changes in his diocese and eliminate some of the many abuses prevalent there, the result of which was that though he was possessed of great force of character, his high temper and lack of tact and diplomacy led him into innumerable controversies. The most famous of these was with Pope Innocent IV, who, desiring to fill the lucrative positions in the church with Italians and Provençals, in 1253 sent the bishop a request that he appoint his (the Pope's) nephew to the first vacant canonry in the cathedral of Lincoln. This Grosseteste flatly refused to do, and, as his clergy stood by him in his fight against this abuse, the matter was finally dropped and it is mainly upon this incident that his fame rests. He was, though, a man of great scholarly attainments, Hebrew, Latin, Greek, French, mathematics, medicine and music being numbered among them, beside which he was one of the most learned preachers of his time and a voluminous writer. Consult Perry, ‘Life’ (London 1871); Luard (editor), ‘Roberti Grosseteste Episcopi quondam Lincolniensis Epistolæ’ (in the Rolls Series, 1862).

GROSSETO, grŏs-sā'tō, Italy, a town of Tuscany, capital of the province of Grosseto, 90 miles south-southeast of Pisa with which it is connected by rail. The cathedral dates from 1294; the restorations were begun in 1855. It is built of red and white marble and belongs to the Italian Gothic style of architecture. The citadel is fortified. Points of interest are the collection of Etruscan antiquities in the Municipio and the ruins of the town of Rusellæ, an old Etruscan city. The chief occupations are trading in cattle, lumber, grain and horses and the manufacture of agricultural implements. Grosseto has been the seat of a bishropic since 1138. Pop. about 3,000.

GROSSI, grōs'sē, **Tommaso,** Italian poet and novelist: b. Belluno, on the Lake of Como, 20 Jan. 1791; d. Milan, 10 Oct. 1853. He studied law at Pavia and settled in Milan, where he passed the remainder of his life as a notary, but his political ideas prevented his rise in his profession. His first attempt at poetry was ‘La

Principe,' written in the Milanese dialect and this was followed in 1816 by two shorter poems, 'La Fuggitivia' and 'La Pioggia d'Oro,' and in 1820 by 'Ildegonda,' a romance in verse. This poem became popular and set the fashion for that style of writing, the success which it attained encouraging him to write 'I Lombardi alla Prima Crociata' in 1826, a poem remarkable for its patriotic sentiment. Despite the fact that Manzoni gives praise to this last poem in his novel 'I promessi sposi' and that the cost of printing was defrayed by a generous subscription, it was soon forgotten. This did not dishearten him, however, and in 1834 he published his 'Marco Visconti,' which at once excited public approval and became the pioneer of the historical novel in Italy. His only other work of note was 'Ulrico e Lida,' published in 1837.

GROSSMITH, George, English actor: b. 9 Dec. 1847; d. 1912. After doing journalistic work for several years he abandoned that profession in 1870 for the stage. His chief rôles have been in Gilbert and Sullivan operas. He toured Great Britain and the United States in 1889 and retired in 1891. His works include several hundred songs and humorous sketches and two books 'The Reminiscences of a Society Clown' (1888) and 'The Diary of a Nobody' (with his brother, Weedon).

GROSSO, grō'sō, **Matto,** Brazil (q.v.), a western central state bordering on Bolivia, Argentina and Paraguay. It has an area of 532,500 square miles and an estimated population of 137,000. Capital, Cuyabá (q.v.).

GROSVENOR, grōv'ē-nėr, **Edwin Augustus,** American educator and author: b. Newburyport, Mass., 30 Aug. 1845. He was graduated at Amherst College in 1867 and at Andover Theological Seminary in 1872, was professor of history at Roberts College, Constantinople, in 1873–90, and of European history at Amherst College in 1892–99. In 1899 he was appointed to the newly established chair of modern governments and their administration and of modern government and international law after 1901. He was also in Smith College as professor of history in 1892–94. His publications include translations from the French of Victor Duruy's 'Modern Times' (1894) and 'General History' (1898); 'Andronike,' from modern Greek; 'The Hippodrome of Constantinople' (1889); 'Constantinople' (1895); 'The Permanence of the Greek Type' (1897) and 'Contemporary History' (1899), extending from 1848 to the present time. He edited "Reference History of the World" in Webster's 'International Dictionary' (1909).

GROSVENOR, Gilbert Hovey, American editor: b. Constantinople, Turkey, 28 Oct. 1875. He was graduated from Robert College at Constantinople (1890) and then studied at Worcester Academy and Amherst College. After teaching for a year he was appointed assistant editor of the *National Geographic Magazine,* of which he became managing editor (1901) and editor (1903). He has been a director of the National Geographic Society since 1899. He is the author of 'The Explorations of the 19th Century' (in the annual report of the secretary of the Smithsonian Institute, 1900); a historical sketch of Peary's exploration of the North Pole (1910); 'Young Russia' (1914); 'See America' (1916). He is also editor of 'Scenes from Every Land' (1907, 1909, 1912) and associate editor of 'Proceedings of the Eighth International Geographic Congress' (1905), and 'Scientific Report of the Ziegler Polar Expedition of 1905–06.'

GROT, grōt, **Nikolai Yakovlevitch,** Russian philosopher: b. Saint Petersburg, 1852; d. 1898. He studied at the university of his native city and became professor of philosophy at Niezhin in 1873. From 1883 he occupied a similar position at Odessa and likewise at Moscow from 1886. He was editor of the journal called *Voprosy Filosofii* (1894–96). He wrote both in French and Russian and his works include 'Nouvelle classification des sentiments' (1878); 'La causalité et la conservation de l'energie' (1890); 'Dreams as a Subject for Scientific Analysis' (1878); 'Psychology of the Feelings' (1880); 'A Criticism on the Conception of Free Will' (1889); 'Turning Points in the Development of the New Philosophy' (1894).

GROT, Yakob Karlovitch, Russian philologist: b. Saint Petersburg, 1812; d. 1893. From 1841–53 he was professor of Russian history at Helsingfors and subsequently at the Alexander Lyceum at Saint Petersburg. His works include 'Philosophical Investigations' (12 vols., 1885); and editions of the works of Derzhavin (9 vols., 1864–80); 'The Correspondence of Catharine II with Grimm' (1884); and the 'Russian Lexicon of the Academy of Saint Petersburg' (2 vols., 1891–92).

GROTE, George, English historical writer: b. Clayhill, Kent, 17 Nov. 1794; d. London, 18 June 1871. After having studied at the Charterhouse, in 1809, he became a clerk in his father's banking house. He kept on with his studies, particularly with philosophy, and his liberal trend of thought gradually drew him into politics. He had written and spoken much in favor of the Reform Bill which was passed in 1832 and in that year he was elected to the House of Commons from London, which seat he continuously occupied until 1841. During all these years he had steadily worked upon his 'History of Greece,' the idea of which was suggested to him by the spirit of partiality displayed in Mitford's 'History of Greece' and which he had severely criticised in an article in the *Westminster Review* (April 1826). He had as early as 1823 devoted himself to the study of Greek history, for a sympathetic interpretation of which his extreme liberality made him admirably suited, and though to a certain extent the spirit of democracy is evident in the 'History of Greece,' yet the facts are placed before the reader with the idea that he will form his own conclusion. His private and public duties had prohibited literary work and it was not until he retired that he completed the first two volumes which appeared in 1845, the last volume of the set, the twelfth, appearing in 1856. Grote also wrote 'Plato and the Other Companions of Socrates' (3 vols., 1865); 'Minor Works' (edited by Alexander Bain, London 1873) and 'Aristotle,' which he left unfinished (2 vols., 1872). He had taken an active interest in educational matters, in 1860 becoming vice-chancellor of the London University and in 1869 president of the University College, and also was elected a trustee of the British Museum. Consult Grote, Mrs., ‘Memoirs’ (London 1873); Bain, Alexander, ‘Character and Writings of G. Grote,’ prefixed to his ‘Minor Works’ (London 1873).

GROTEFEND, grō'tę-fĕnt, **Georg Friedrich,** German archæologist and philologist: b. Münden, near Cassel, Prussia, 9 June 1775; d. Hanover, 15 Dec. 1853. He received his early education at Hanover and Ilfeld, and completed his studies at the University of Göttingen (1795–97). He became prorector and later conrector of the gymnasium at Frankfort-on-the-Main (1803–21), and for nearly 30 years (1821–49) was director of the lyceum at Hanover. His research in the field of Latin philology was of great value, but his importance is chiefly due to the fact that he first deciphered the old Persian inscriptions of Persepolis, presenting the results of his labors in a paper before the Academy of Science at Göttingen, 4 Sept. 1802. Chief among his publications are ‘Rudimenta linguæ Umbricæ’ (1835–38); ‘Neue Beiträge zur Erläuterung der babylonischen Keilinschrift’ (1840); ‘Zur Geographie und Geschichte von alt-Italien’ (1840–42); ‘Rudimenta Linguæ Oscæ (1839), etc.

GROTESQUE, in architecture, a fantastic ornament formed by exaggerated lines and fanciful groupings of animate and inanimate objects. It was found in the old Roman grottoes and revived during the Renaissance, when it became very popular.

GROTH, grōt, **Klaus,** German poet: b. Heide, Prussia, 24 April 1819; d. Kiel, 1 June 1899. He was educated at the secondary school at Tondern, and then taught at a girl's school at Heide. After a few years of ill-health, which he spent in retirement, Groth resumed his studies at Kiel (1853), and three years later received the degree of Ph.D. from the university at Bonn. In 1858 he instructed in the German language and literature at Kiel, where he was appointed professor in 1866. His works are written in the Low-German or Platt-Deutsch; and it is in his effective use of this language for literary purposes that his chief contribution to German literature lies. His works are genuine folk-literature, sincere and sympathetic in their interpretation of the life they represent. They include ‘Quickborn, Volksleben in plattdeutschen Gedichten Ditmarscher Mundart’ (1852; 25th ed., 1900, trans. into High German by Hoffmann, 1856); ‘Vertelln’ (1855–59, 3d ed., 1881), which is a collection of stories; ‘Hundert Blätter’ (1854), poems in High German; ‘Voer de Goern’ (1858); and ‘Ut min Jungsparadies’ (1876). His collected works were published at Kiel (4 vols., 1893). His memoirs were edited by E. Wolff (1891). Consult Eggers, K., ‘Klaus Groth und die plattdeutsche Dichtung’ (Berlin 1885); Siercks, ‘Klaus Groth, sein Leben und seine Werke’ (Kiel 1899).

GROTH, Paul Heinrich von, German mineralogist: b. Magdeburg, 23 June 1843. He studied at the Freiberg Mining School and later at Berlin, and taught at both of these schools. In 1872, he was appointed professor of mineralogy at Strassburg; and in 1883 at Munich, where he was also given charge of the state mineralogical museum. His special contribution to his subject has been in the study of crystals. He was the founder and editor for many years of *Zeitschrift für Krystallographie und Mineralogie.* His published works include ‘Tabellarische Uebersicht der Mineralien nach ihren krystallographisch-chemischen Beziehungen geordnet’ (1898); ‘Physikalische Krystallographie’ (1895); ‘Grundniss der Edelsteinkunde’ (1887); ‘Chemische Krystallographie’ (1906); ‘The Optical Properties of Crystals’ (trans. by B. H. Jackson 1910).

GROTIUS, grō'chi-us, or De Groot, Hugo, Dutch scholar and statesman: b. Delft, 10 April 1583; d. Rostock, 28 Aug. 1645. He was a pupil of Joseph Scaliger at the University of Leyden, conducted his first lawsuit in his 17th year; and in his 24th was appointed advocate-general. In 1613 he became syndic, or pensionary, of Rotterdam. In 1615 he was sent to England in order to arrange the difficulties arising from the claims of the English to exclude his countrymen from the Greenland whale-fishery. He declared himself on the side of Barneveldt (q.v.) in the struggle between the Remonstrants and their opponents, and was sentenced to imprisonment for life in the fortress of Loevenstein. He succeeded in escaping by concealing himself in a chest, and after wandering about for some time in the Catholic Netherlands escaped to France, where Louis XIII gave him a pension of 3,000 livres, withdrawn in 1631. He returned to Holland, but through the machinations of enemies was condemned to perpetual banishment. He later went to Hamburg, and in 1634 to Stockholm, where he was appointed counsellor of state and Ambassador to the French court, in which post he remained for 10 years. On his return to Sweden by way of Holland he met in Amsterdam with a distinguished reception. Most of his enemies were dead, and his countrymen repented of having banished the man who was the honor of his native land. With the talents of the most able statesman, Grotius united deep and extensive learning. He was a profound theologian, excellent in exegesis, his ‘Commentary on the New Testament’ being still esteemed; a distinguished scholar, an acute philosopher and jurist and a judicious historian. His writings have had a decisive influence on the formation of a sound taste and on the diffusion of an enlightened and liberal manner of thinking in affairs of science. As a critic and philologist he seizes the genius of an author with sagacity, illustrates briefly and pertinently and amends the text with facility and success. His metrical translations from the Greek are executed with the spirit of a poet. Among the modern Latin poets he holds one of the first places and he also tried his powers in Dutch verse. But the philosophy of jurisprudence has been especially promoted by his great work on natural and national law, ‘De Jure Belli et Pacis,’ which represented the study of 20 years and laid the foundation of the new science of international law; besides which he wrote ‘Annales et Historiæ de Rebus Belgicis’ (1657); ‘Annotationes in Vetus Testamentum’ (1644); ‘Annotationes in Novum Testamentum’ (1641–46); ‘De Veritate Religionis Christianæ’ (1627). As an awakener of the conscience of humanity, Grotius' writings have had profound influence on American jurisprudence and diplomacy. This was acknowledged, especially at the first International Peace Congress, held at The Hague in 1899. The president of the American delegation, Andrew D. White, laid upon the tomb of Grotius, in the Great Church at Delft, a silver-gilt metal wreath, in the name of the government of the United States. By invitation of the city authorities, a banquet was tendered in honor of the Americans. Still more has Grotius influenced the New England theology, his governmental theory of the Atonement being that which dominated the American pulpits for a century or more; the modified Calvinism of Andover, championed by Jonathan Edwards, Bellamy, Edmunds and Park, being opposed to the purer Calvinism of Princeton and New Brunswick. A superb statue of Grotius, by Stvackée, stands in the public square in Delft. In the pavement are wrought, in white letters, his motto «Let each one walk with God.» Consult Bertens, H., 'Hugo de Groot en zijn rechtsphilosophie' (Tilburg 1905); Butler, 'Life of Hugo Grotius' (London 1826); Creuzer, 'Luther and Hugo Grotius' (Heidelberg 1846); De Vries, 'Huig de Groot en Maria van . Reigersbergen' (Amsterdam 1827); Vreeland, 'Hugo Grotius, the Father of the Modern Science of International Law' (New York 1917); White, Andrew D., 'Seven Great Statesmen in the Warfare of Humanity with Unreason' (ib. 1910).

GROTON, Conn., town in New London County, on the Thames River, the New York, New Haven and Hartford Railroad; opposite New London. In 1637 Captain Mason stormed the fortress held by the Pequots, and many lives were lost, both white and Indians. A more disastrous fight occurred here 6 Sept. 1781, when 800 British troops under Benedict Arnold attacked Fort Griswold (q.v.), which was garrisoned by 150 soldiers. The Americans heroically resisted, but were overwhelmed by numbers, and Arnold and his force entering the fort butchered 85 men and wounded 65. Soon after 35 of the 65 died from the effects of their wounds. This battle is known in history as the «Massacre of Fort Griswold.» The site is now a State reservation, with a fine monument in commemoration of the defenders. Groton contains ship-building yards, several manufactories and the Bill Memorial Library. The government is regulated by annual town meetings. The waterworks and electric-light plants are municipally owned. Pop. 6,495. Consult Burgess, 'Historic Groton' (Moosup, Conn., 1909); Caulkins, 'The Stone Records of Groton' (1903); 'History of New London County'; 'Magazine of American History,' Vol. VII (New York 1880); 'The Massacre of Fort Griswold.'

GROTTAGLIE, grȯt-tä'lyā, Italy, a city in the province of Lecce, 12 miles northeast of Taranto. The principal industries are the quarrying of clay and chalk, and the manufacture of pottery and leather goods. There is also considerable trade in oil, wine and fruit. Pop. (commune) about 12,000.

GROTTGER, grȯt-gär, **Arthur von,** Polish painter: b. Ottyniovitz, 1837; d. 1867. He received his education at Lemberg, Cracow and Vienna. His pictures are mainly historical and are imbued with a profound feeling for his country's tragic condition. They include several cycles 'Warsaw' (1861); 'Poland' (1863); 'Lithuania' (1863).

GROUCHY, groo'shē, **Emmanuel,** MARQUIS DE, French marshal: b. Paris, 23 Oct. 1766; d. Saint Etienne, 29 May 1847. He acquired distinction in the revolutionary armies and in the campaign of 1800 fought in the army of the Rhine under Moreau, and rendered important service at the battle of Hohenlinden. In the war with Prussia in 1806, and with Russia in 1807, he acquired new fame and was sent to the army of Italy under Prince Eugene. At the battle of Wagram his masterly manœuvres contributed greatly to the victory. On the restoration he was banished, but allowed to return in 1815. On Napoleon's return from Elba he immediately joined him, was made a marshal and obtained first the command of the army of the Alps, and then the command of the cavalry in the grand army. After the battle of Ligny he was sent on the following day with 34,000 men and 100 cannon to follow the retreat of the Prussian army under Blücher. While he here on the 18th engaged with Thielemann, Napoleon gave battle at Waterloo, the disastrous issue of which has been sometimes laid to Grouchy's charge, from having failed to observe how three divisions of the Prussian army were advancing to Waterloo to take Napoleon in flank and rear, while Thielemann alone remained at Wavres. Again banished, he came to the United States, where he lived five years, but was permitted to return in 1821. After the July Revolution he was elected to the Chamber of Deputies by the department of Allier, supported the new dynasty and was appointed in 1831 marshal, and in 1832 a peer. His memoirs were published 1873–74.

GROUND BEETLES, the family *Carabidæ,* predatory beetles of various sizes and appearance. It contains upwards of 1,200 described species, nearly all of nocturnal habit, and, consequently, dark, mostly black in color. Some species, however, are metallic green or blue, or beautifully variegated. The family contains many beneficial species, which roam fields, meadows and gardens, destroying many injurious pests. They fly freely at night and seek concealment in the daytime under stones and logs and in other convenient hiding-places. Most species are terrestrial, but a few forms, such as species of *Calosoma,* known as «caterpillar-hunters,» climb the trunks of trees in search of noxious caterpillars which they destroy. A remarkable genus is that of the bombardier beetles (q.v.). A very few are occasionally injurious, among them *Agonoderus pallipes,* which burrows into newly-planted seeds of corn; and two species of *Harpalus* which are destructive to strawberries. These latter insects are interesting because of their dual habit of being carnivorous as well as herbivorous. They attack, in the beetle stage, the seeds of Ambrosia, and also eat insects of various kinds. In form the species vary greatly; the antennæ are inserted behind the base of mandibles under a frontal ridge; maxillæ with the outer lobe palpiform usually bi-articulate, while the inner lobe is usually curved acute and ciliate with spines. The epimera and episterna of the phothorax are usually distinct; the three anterior segments of the abdomen, usually six, rarely seven or eight in number, are connate.

The legs are slender, formed for running; anterior and middle coxæ globular, posterior ones dilated internally, and the tarsi are five-jointed. They are runners and do not fly, the hind wings being often absent. The larvæ are found in much the same situation as the adult beetles, and are generally oblong, broad, with the terminal ring around with two horny hooks or longer filaments and with a single false leg beneath.

GROUND-CHERRY, herbaceous plants of the potato family, constituting the genus *Physalis*, scattered through most of the world. About 35 species are natives of the United States, and some are known as «tomato strawberries,» and are cultivated for the sake of their berry-like fruit, which is hidden within a persistent balloon-like calyx.

GROUND CUCKOO, a coucal (q.v.).

GROUND-DOVE, any of various species of pigeons which live mainly on the ground and seek their food there. The name is especially given to the genus *Columbagallina*, small birds of the warmer parts of America, of which one gentle and familiar species (*C. passerina*) is well known in the South Atlantic States, along the coast. The bronze-wing pigeons of Australia and the large pigeons of the genus *Goura* (q.v.) are also so called.

GROUND HOG, the name applied in the United States to the marmot or woodchuck (qq. v.).

GROUND HORNBILL. See HORNBILL.

GROUND IVY, a familiar European labiate plant (*Glechoma hederacea*), allied to mint, with a creeping stem and purple flowers. The leaves are crenate-reniform and the flowers are in threes. It was formerly employed to flavor ale and also medicinally.

GROUND-NUT, a climbing plant (*Apios apios*) of the bean family, which puts out dense clusters of dull purple flowers after most other plants have stopped blooming; these are velvety within and sweetly fragrant. The tuberous rootstock is edible, whence the name.

GROUND RENT. (1) A rent reserved to himself and heirs by the grantor of an estate in land in fee simple out of the land granted. (2) Rent paid, usually on a lease for a term of years, for the right to occupy and build upon land. In Roman law ground rent was annual rent paid by the lessee of a perpetual lease of building land. In England ground rents were part of the feudal system, and this form of tenure is continued in that country to-day in the sense of a fixed rent paid for the use of land for a period of years, with the right to make improvements thereon. In a modified form it exists also in Scotland, where it is known as «ground annual.»

In the United States pure ground rent, in the sense of definition (1) above, exists mainly in Pennsylvania, although the manor lease, formerly quite common in New York State, comes well within this definition, inasmuch as in this form of tenure a fee simple estate is conveyed to the grantee. The rent paid under a lease for a term of years renewable forever as it exists in Maryland, as well as the rent under the perpetual lease of Georgia, is properly termed ground rent. In Pennsylvania, a ground rent, being a hereditament, descends to the grantor's heirs, whereas in Maryland and other parts of the United States the leasehold is treated as personal property. This form of tenure is found elsewhere, to a limited extent, in other parts of the United States, mainly in Ohio and Louisiana. In the latter State the contract, to constitute a valid ground rent, must convey the property in perpetuity and the rent reserved must be a charge upon the land itself. As ground rent is usually fixed for a long period of years, the difference between this form of rent and economic rent is often necessarily very large. See RENT.

GROUND-SLOTHS, a family (*Megatheriidæ*) of extinct edentates (*Gravigrada*) related to the modern sloths but of terrestrial habits, and in some genera of gigantic size. They are of special interest because some survived into the human period. They have a generalized structure, exhibiting the head and teeth of a sloth, associated with the vertebræ, limbs and tail of an ant-eater. They were chiefly South American, but spread as far north as the western United States in the Pliocene and Pleistocene epochs, and did not become extinct until very recent times. Megatherium is the most prominent and familiarly known genus. Its largest species, *M. americanum*, almost equaled an elephant in size, but was much longer and lower in stature, owing to the shortness of its extraordinarily heavy limbs; some skeletons exceeds 20 feet in length. The head was very small, especially as to brain-cavity, and the lower jaws projected in a spout-like extension implying some kind of proboscis. The tail was thick and heavy and probably useful as an aid to support when the great beast reared up; and the hind feet had two great claws each, which seem to be the only defensive weapon possessed. «The entire structure of the extremities,» according to Von Zittel, «proves that the gigantic sloth could move over the ground but slowly and clumsily; on the other hand the fore limbs served as grasping organs, and were presumably employed to bend down and break off twigs and branches, and even to uproot whole trees, while the weight of the body was supported on the hind limbs and tail.» The skin of the megatheres had no bony armor, and was probably covered with long hair.

The allied genera Lestodon, Mylodon, Glossotherium, Scelidotherium and Megalonyx, were all of smaller size and their members seem to have been very abundant all over South America during the Pleistocene epoch. Megalocnus is a genus of a primitive character peculiar to Cuba. The genus Gryptotherium is of peculiar interest as perhaps the last survivor of the great extinct Pleistocene fauna. The discovery of part of the hide of one of these animals, half buried in dry dust, in a cave at Last Hope Inlet, Patagonia, showed that their skin was thick, studded with small embedded bony nodules, and thickly covered with long, coarse, yellowish-brown hair, as well preserved as are the feathers of the moas in New Zealand. The skin, says the discoverer, Dr. Moreno of Buenos Aires, shows patches of red color, suggesting of course blood-stains; and when small bits were chemically analyzed they yielded serum and the substances of glue. In view of this it seems impossible to believe that the skin can be of any great age, for bacteria would have finished their work upon the serum and gelatine long ago. An equally fresh-looking skull was found, as if in a small stone enclosure, and wounded in such a way as only man could have inflicted; and there are legends among the Indians that such creatures were known to their ancestors. Dr. Moreno is of the opinion, from evidences found in this cave and elsewhere, that these animals had been domesticated by man, but to what extent and for what purposes is unknown. Consult Scott, ‹History of Land Mammals› (New York 1913).

GROUND-SNAKE, one of the little, burrowing worm-shaped snakes of the genus *Carphophiops*, which abound in tropical America. One species (*C. amœnus*) is numerous under stones and logs in the Southern States, and is glistening chestnut in color above and salmon-yellow beneath. A larger, more purplish species (*C. vermis*) is called «ground-worm» in Louisiana. These snakes are perfectly harmless and are the least specialized of the *Colubridæ*.

GROUND SQUIRREL. See SQUIRREL.

GROUND WATER, that water which exists underground in the pores of the rock. It is the source of all wells and springs. Most of it comes from rainfall which has soaked into the soil and is known as meteoric water. A smaller part is given off by molten rocks as they cool and is called magmatic water. The latter is believed to be very important in the formation of ore deposits. Another part is believed to have been enclosed in the pores of the sediments as they were laid down on the sea bottom and represents what may be called fossil sea water. This is known as connate water. Deep-seated magmatic waters are also called juvenile waters and surface or meteoric waters are sometimes called vadose. See ARTESIAN WELLS; ORE DEPOSITS; WATER SUPPLY; WELLS; and the section in GEOLOGY devoted to *Ground Water*.

GROUP INSURANCE. This is the application of life, health and accident insurance to the employees of one concern, as a rule not less than 100 in number, the employer paying the premiums. The plan is an outgrowth of the interest of employers in the welfare of their employees, arising largely from a persuasion that it pays from a purely business standpoint to guard the worker and his dependents against the hazards of injury, sickness and death. Beginning with the use of the regular life policies and dealing direcly with the employer, at the end of 1912 the larger companies of the United States had covered about 10,000 lives to the extent of about $13,000,000. By the ending of 1917 about half a million lives were covered to the extent of a quarter of a billion of dollars. Banks, railroads and mercantile houses, as well as factories, have availed themselves of this form of protection. With the increasing interest in social or welfare insurance, as already embodied in the workmen's compensation provisions now legalized in two-thirds of the States of the United States, the future will witness a large use of this new plan for health and accident as well as life insurance. The cost is much reduced by reason of the elimination of medical examination and the other usual acquisition expenses. A marked result already developed and highly satisfactory to employers who have adopted group insurance is the improved morale and stability of their working force. The laws of a number of States have already been modified to recognize and encourage this development of insurance.

GROUPERS (Anglicized form of Spanish name «Garrupa»). Tropical and semi-tropical sea-bass of the genera *Epinephelus, Promicrops, Mycteroperca* and their allies. All are valuable food-fishes and most of them of large size, bright coloration and high quality as game-fishes. About a dozen species enter the waters of the Southern States or California, the most common along the Atlantic Coast being the red grouper (*E. morio*), called «Cherna» and by many other local names. It is a large fish (20 to 40 pounds), is particularly abundant on the west coast of Florida, keeps near the bottom and is a voracious carnivore, consuming large quantities of small fishes, as well as crabs, etc. It is a favorite with market-fishermen, because it bears so well the hardships of transportation. The yellow-finned grouper or rockfish (*M. venenosa*); yellow grouper (*M. olfax*); and black grouper of the Florida Keys (*M. bonaci*), are also large and important; while another black grouper (*Promicrops*) is the famous jew-fish (q.v.) of sportsmen. Several other species are elsewhere described under particular names as CABRILLA, MERO, etc. Consult ‹American Food and Game Fishes,› by Jordan and Evermann (New York 1902).

GROUPS, Theory of. Everywhere in mathematics are encountered systems of *operations*, possessing definite laws of combination. Thus, two geometric motions compound into a single motion, two algebraic transformations into a single transformation, under laws as definite as the primordial 2 × 2 of arithmetic but otherwise capable of infinite variety of simplicity and intricacy. Consider, for example, the 12 rotations of a regular tetrahedron into itself. Any two of these rotations compound into a third one among them, easily identified on a model. By a simple convention, these various combinations can be registered in algebraic form. The several rotations may be designated by the marks, $a, b, c, \ldots$; the symbol ab may indicate that a is followed by b, and at the same time designate their resultant effect. This resultant ab is called the *product* of a and b in the order written; it is itself one of the 12 rotations, say c, and we write $a\,b = c$. It is an instructive exercise to tabulate the products of two or more of the 12 rotations, identifying each product with one of the 12 original rotations. It is possible to express all the 12 rotations as products of two of them, say of the rotation a through 120 degrees about an axis through one of the four vertices of the tetrahedron and the rotation b through 180 degrees about an axis joining the middle points of two opposite edges. It may be noted that the products ab and ba are here not the same rotation: a and b are not *commutative* as in ordinary algebra. On the other hand aa, which is a rotation through 240 degrees about the axis of a, is conveniently denoted by a^2; a^3 and b^2, both of which restore every point to its initial position, may appropriately be equated to 1 (identity), which is included among the 12 rotations. The three rotations b_1, b_2, b_3 about the (trirectangular) axes joining the middle points of opposite edges of the tetrahedron will be found to be commutative;

in fact $b_1b_2 = b_2b_1 = b_3$, $b_2b_3 = b_3b_2 = b_1$, $b_3b_1 = b_1b_3 = b_2$; $(b_1^2 = b_2^2 = b_3^2 = 1)$.

The tetrahedral rotations furnished a simple instance of an *algebra of operations*. Any system of operations possesses such an algebra, of greater or less extent. And, as many different systems of operations, taken from widely separated mathematical fields, often present one and the same algebra, these algebras are worthy of study by themselves, as generalizing and unifying instruments. Since each algebra is completely defined by the laws of combination of the symbols $a, b, c, \ldots.$, we may abstract the idea of operation entirely and deal with the pure algebra. This position having been reached, it is inevitable to the mathematical mind to reverse the order of thought and to devise algebras a priori, leaving their concrete interpretation for secondary consideration. In constructing such algebras, choice among the infinite possibilities will be dominated by the two principles of generality and usefulness. The two qualities are combined in high degree in the algebra of *groups*.

Definition of Group.— A system of symbols, or *elements*, $a, b, c, \ldots.$ (finite or infinite in number), conceived as capable of multiplication with each other, is said to form a *group* if the following conditions are fulfilled:

(1) The product of any two elements of the system is a third element of the system.

(2) The multiplication is associative. $(ab)c = a(bc)$, (but not necessarily commutative: ab and ba need not be equal).

(3) Equalities $ab = ab'$ or $ab = a'b$ require $b = b'$ or $a = a'$, respectively.

The *order* of a group is the number n of its elements. A group is briefly called finite or infinite, according as its order is finite or infinite.

The defining conditions (1)—(3), classic in their simplicity, possess a most extraordinary fecundity. From them alone proceed, by pure logical deduction, the vast and intricate systems which make up the algebra of groups.

As a primary deduction it may be noted that every finite group G contains one and only one element, identity (denoted by 1), such that for every element x of G $1x = x1 = x$. A proper power x^m of any element x of G is equal to this element 1; the lowest exponent m for which this is true is called the order of x; every power of x is equal to one of the m powers, $x, x^2, x^3, \ldots\ldots, x^{m-1}, 1$. The *inverse* x^{-1} of x is defined by $x^{-1}x = 1 = x^{m-1}x$, whence by (3) $x^{-1} = x^{m-1}$; then $x^{-2} = (x^2)^{-1} = x^{m-2}$, etc. The analogy to ordinary algebra (of mth roots of unity) is here perfect. These elementary principles may be illustrated by reference to the tetrahedral group G of order 12 above.

An infinite group does not necessarily contain the element 1 nor the inverse elements. Thus all the motions of a point along a line in *one* direction form an infinite group, but this does not contain the reverse motions nor the case of no motion. The prevailing tendency is, however, to restrict the name group to systems which contain the inverse of their elements, and consequently the element 1.

A part of the elements of a group G, taken by themselves, may form a group H, which is then called a *subgroup* of G. Thus the powers of any element x of G form a cyclical group H which is either G itself or a subgroup of G. The tetrahedral group has a subgroup of order 4 composed of b_1, b_2, b_3 and identity. The order h of a subgroup H of G is always a divisor of the order g of G. If p^i, where p is a prime number, is a divisor of g, G has one or more subgroups of order p^i, and the total number of these subgroups is of the form $kp + 1$, where k is an integer. If p^a is the *highest* power of p that divides g, $kp + 1$ is also a divisor of g. These theorems of Sylow and Frobenius are of great assistance in the analysis of groups of finite order. Thus a group of order pq, where p and q are prime numbers, has a single subgroup of order p; it has also a single subgroup of order q, unless p is of the form $kq + 1$. Thus the order $15 = 5.3$ presents only one case, while the order $21 = 7.3$ presents two. For a further example, the icosahedral group of rotations, which is of order 60, contains subgroups of orders, 2, 4, 3, 5, and also 6 and 10. The 15 lines joining middle points of opposite edges of the icosahedron form five sets of trirectangular axes, each of which sets is converted into itself by a tetrahedral group contained as subgroup in the icosahedral group. There are no subgroups of orders 15, 20, or 30 present.

Isomorphism and Transformation.—Groups which have the same algebra are called isomorphic. Written in the same symbols, isomorphic groups are by definition identical. But in the practice the isomorphism requires to be detected, being veiled under dissimilarity of notation. Once detected among groups derived perhaps from quite different mathematical fields, isomorphism constitutes the unifying principle already mentioned. For example, the tetrahedral group is isomorphic with the group of 12 substitutions (rearrangements) which it produces among the four vertices of the tetrahedron; and the icosahedron group is isomorphic with the corresponding group of substitutions of the five trirectangular axis systems mentioned above. These isomorphisms contribute materially to the theory of equations of degrees four and five.

One instance of isomorphism is expressible by a universal formula. Let G be any group, with elements $a, b, c, \ldots$, and let t be any element whatever capable of combination with $a, b, c, \ldots$, under conditions (1)—(3); then the elements $a' = t^{-1}at$, $b' = t^{-1}bt$, $c' = t^{-1}ct, \ldots$ form a group G' $(t^{-1}Gt)$, and this group G' is isomorphic with G. For if $ab = c$, for example, then $a'b' = t^{-1}at \cdot t^{-1}bt = t^{-1}abt = t^{-1}ct = c'$, so that not only a', b', c' form a group, but the algebra of this group is identical with that of G. The process of deriving G' from G is called *transformation* of G by t; G' is called the *transform* of G by t. All transforms of a group G (by $t, s, \ldots.$), are isomorphic with G, and with each other.

Transformation has a very simple concrete significance. Suppose that G is a group of *operations*, $a, b, c, \ldots.$ performed on a field of objects A, and that t converts A into a second field of objects B; then $t^{-1}Gt$, i.e., t reversed, followed by G, followed by t, produces among the objects B an effect precisely parallel to that produced by G on the corresponding objects A. For example, if A is a plane, G a group of operations in A, t a projection of A on a second plane B, then $t^{-1}Gt$ is the projection of the group G on B. Or again, if G is a group of rotations about an axis A, and t a rotation which moves A into the position B, then $t^{-1}Gt$ is a second group of rotations, precisely similar to G, performed about the new axis B. In general, transformation in the present sense is the concomitant, for operations, of transformations in the ordinary sense as affecting objects.

Group Analysis.— If G is any group and H any subgroup of G, all the transforms of H with respect to the elements of G are contained in G. These transforms are called the conjugates of H in G. Thus the subgroups of order 3 of the tetrahedral group are conjugate in that group. A noteworthy general example is that of the subgroups of order p^α (α a maximum) of a group G; these $kp+1$ subgroups are always conjugate. The number of conjugates of any subgroup H of G is a divisor of the order of G. In the important case where its conjugates all coincide, H is an *invariant* subgroup of G. Every group G has two invariant subgroups, itself and the identical operation. If it has no other invariant subgroups, G is *simple;* otherwise G is *compound*. Thus the four rotations 1, b_1, b_2, b_3 of the tetrahedral group form an invariant subgroup, this being in fact the only subgroup of order 4, of the tetrahedral group.

A *maximum* invariant subgroup H of G is not contained in any larger invariant subgroup of G. A *principal series of composition* of G consists of G and a series of subgroups, H, I, J, …, 1 of G, each of which is a maximum invariant subgroup of the preceding one. The ratios of the orders g, h, i, j, …, 1 of these subgroups is a principal series of *factors of composition* of G. Apart from their order of succession, these factors of composition remain the same for every principal series of composition of G. They play an important part in the theory of algebraic equations.

Every compound group G is reducible to a sequence of simple groups, whose orders are the factors of composition of G. Only simple groups present new problems. The chief problem of the pure theory of groups is therefore the determination of all simple groups. This problem awaits solution. All groups of prime order are simple. Simple groups of composite order are of rare occurrence, the only cases below order 2000 being one group for each of the orders 60, 168, 360, 504, 660, 1092. The number of different prime factors in the order of a simple group not of prime order is at least three, and the total number of prime factors is at least six (orders 60, 168, 660, 1092 being the only exceptions). No simple groups of odd order have as yet been found. Several series of orders of simple groups are known, for example, $\frac{1}{2}n!\,(n>4)$, $\frac{1}{2}p^n(p^m-1)$, $(p>3)$, etc.

A group whose elements are commutative is called an *abelian* group. Every subgroup and every element of an abelian group is invariant. The factors of composition are here the prime factors of the order.

Example of Group Construction.— Let a and b be two elements of prime orders p and q ($a^p=1=b^q$) and subject to the further condition $b^{-1}ab=a^i$. We find successively $b^{-1}a^2b=b^{-1}ab\cdot b^{-1}ab=a^i\cdot a^i=a^{2i}$, $b^{-1}a^3b=a^{3i}$ … $b^{-1}a^jb=a^{ji}$; $b^{-2}a^jb^2=b^{-1}(b^{-1}a^jb)\,b=b^{-1}a^{ji}b=a^{ji^2}$, $b^{-3}a^jb^3=a^{ji^3}$, …, $b^{-k}a^jb^k=a^{ji^k}$, …, $b^{-q}a^jb^q\,(=1a^j1)=a^j=a^{ji^q}$. Hence $i^q\equiv 1 \pmod{p}$. If $p-1$ is not divisible by q, i must be 1, $b^{-1}ab=a$, $ab=ba$, that is, a and b are commutative, and their various products ab form an abelian group of order pq. (This group consists of the powers of one element, say ab). But if q divides $p-1$, the congruence $i^q\equiv 1$ has roots i different from 1. Any one of these roots i having been chosen, the conditions $a^p=1=b^q$, $b^{-1}ab=a^i$ are consistent and lead again to a group of order pq composed of the distinct products a^kb^l; the last group is non-abelian. For $p=3$, $q=2$, the second group presents the *multiplication table*

1	1	a	a^2	b	ab	a^2b
a	a	a^2	1	ab	a^2b	b
a^2	a^2	1	a	a^2b	b	ab
b	b	a^2b	ab	1	a^2	a
ab	ab	b	a^2b	a	1	a^2
a^2b	a^2b	ab	b	a^2	a	1

Substitution Groups.— The permutations or *substitutions* of n given letters x_1, x_2, …, x_n form a group (the symmetric group) of order $n!$. The order of any group of substitutions of n letters is a divisor of $n!$. An individual substitution is written in cycles: thus $(x_1x_2x_3)(x_4x_5x_6x_7)$, or simply $(1\,2\,3)(4\,5\,6\,7)$, signifies that $x_1x_2x_3$ are to be replaced by $x_2x_3x_1$, and $x_4x_5x_6x_7$ by $x_5x_6x_7x_4$. Every finite group is expressible as (isomorphic with) a substitution group. Thus in the case of the group of order 6 above, if we denote the elements 1, a, a^2, b, ab, a^2b for convenience by x_1, x_2, …, x_6, the six lines of the table are obtained from the first line by the six substitutions 1, (123)(456), (132)(465), (14)(26)(35), (15)(24)(36), (16)(25)(34), which form a substitution group isomorphic with the original group.

Those substitutions of n letters x_1, x_2, …, x_n which leave a given function of x_1, x_2, …, x_n unchanged in form, form a group. Thus the function $\phi_1\equiv x_1x_2+x_3x_4$ is unchanged by the eight substitutions G_1 : 1, (12), (34), (12)(34), (13)(24), (14)(23), (1324), (1423). The substitution t: (23) converts ϕ_1 into $\phi_2\equiv x_1x_3+x_2x_4$ and *transforms* the group G_1 *of* ϕ_1 into the group $G_2=t^{-1}G_1t$: 1, (13), (24), (13)(24), (12)(34), (14)(23), (1234), (1432) of ϕ_2.

Interesting examples of substitution groups may also be obtained by determining those substitutions of n letters x_1, x_2, …, x_n which transform the substitution $(12\ldots n)$ into its powers. If n is a prime number, the order of this (metacyclic) group is $n(n-1)$.

For further discussion of substitution groups see the article GALOIS THEORY OF EQUATIONS.

Groups of Linear Transformations.—All the linear transformations of a complex variable z, $z'=(\alpha z+\beta)\ /\ (\gamma z+\delta)$, for which $\alpha\delta-\beta\gamma\neq 0$, form a group. For two of them in succession evidently amount to a third linear transformation. Thus $S: z'=1/z$ and $T: z'=1-z$ give $ST: z'=1-1/z=(z-1)/z$, $TS: z'=1/(1-z)$. The group of all linear transformations of z is both infinite and *continuous*. If α, β γ, δ are restricted to integral values, the resulting group is still infinite but discontinuous. The *modular* group is subject to the still further condition $\alpha\delta-\beta\gamma=1$; this is the group connecting the values of the ratio ω of the two periods ω_1, ω_2 of the elliptic integral $u=\int(4z^3-g_2z-g_3)^{-\frac{1}{2}}dz$.

There exist only a finite number of non-isomorphic types of finite groups of linear transformations of z. If z is represented on a spherical surface, every rotation of the sphere produces a linear transformation of z. Those rotations of the sphere which convert into itself a regular solid inscribed in the sphere, or a regular polygon of n sides inscribed in a great circle (equator), form a group. These groups are of orders 60 (icosahedron, dodecahedron), 24 (octahedron, cube), 12 (tetrahedron), $2n$ (dihedron), n (cyclical). They give all the non-isomorphic types of finite groups of linear transformations of z. The octohedral group is also isomorphic with the symmetric substitution group of four letters, the tetrahedral and icosahedral groups with (alternating) substitution groups of four and five letters, respectively.

A simple example of a (dihedral) group of order 6 is generated by the transformations $S: z' = 1/z$ and $T: z' = 1 - z$ above.

The linear transformations of z written in homogeneous form $z'_1 = \alpha z_1 + \beta z_2$, $z'_2 = \gamma z_1 + \delta z_2$ furnish *homogeneous* linear groups. Increasing the number of variables, we arrive at the general homogeneous linear groups $z_1 = a_{11}z_1 + a_{12}z_2 + \dots + a_{1n}z_n$, $z_2' = a_{21}z_1 + a_{22}z_2 + \dots + a_{2n}z_n$, $\dots z_n' = a_{n1}z_1 + a_{n2}z_2 + \dots + a_{nn}z_n$ identified, for example, with projective geometry. Curves, surfaces, etc., frequently have linear transformations into themselves, these always forming a group. Thus a plane cubic curve has in general such a group of order 216. Linear *congruence* groups should also be mentioned. An example is the *simple* group of order $\frac{1}{2}p(p^2-1)$ $(p > 3)$ composed of the linear transformation $z' = (\alpha z + \beta) / (\gamma z + \delta)$ when α, β, γ, δ, z', z are integers taken mod. p.

Continuous Groups.— These are groups of transformations involving continuous parameters, such as the entire group of linear transformations of z, or the entire group of motions in a plane or in space. The theory of these groups, which has been extensively developed by Sophus Lie and his followers since 1870, has important applications to geometry, and especially to the theory of differential equations.

Historical.—The theory of groups was originally developed by Galois, Cauchy and their successors under the particular guise of substitution groups. It was with Sylow's memoir in the 'Mathematische Annalen,' Vol. V (1872) that the theory began to assume its independent abstract form. Among those who contributed to this movement are Cayley, Klein, Dyck and others. But it is to Frobenius, above all others, that we owe the great developments of the pure theory which have been accomplished in the last 25 years. The theory of group *characteristics,* recently created by Frobenius, is destined to produce brilliant results in the near future.

Other historical elements are traceable in the accompanying bibliography.

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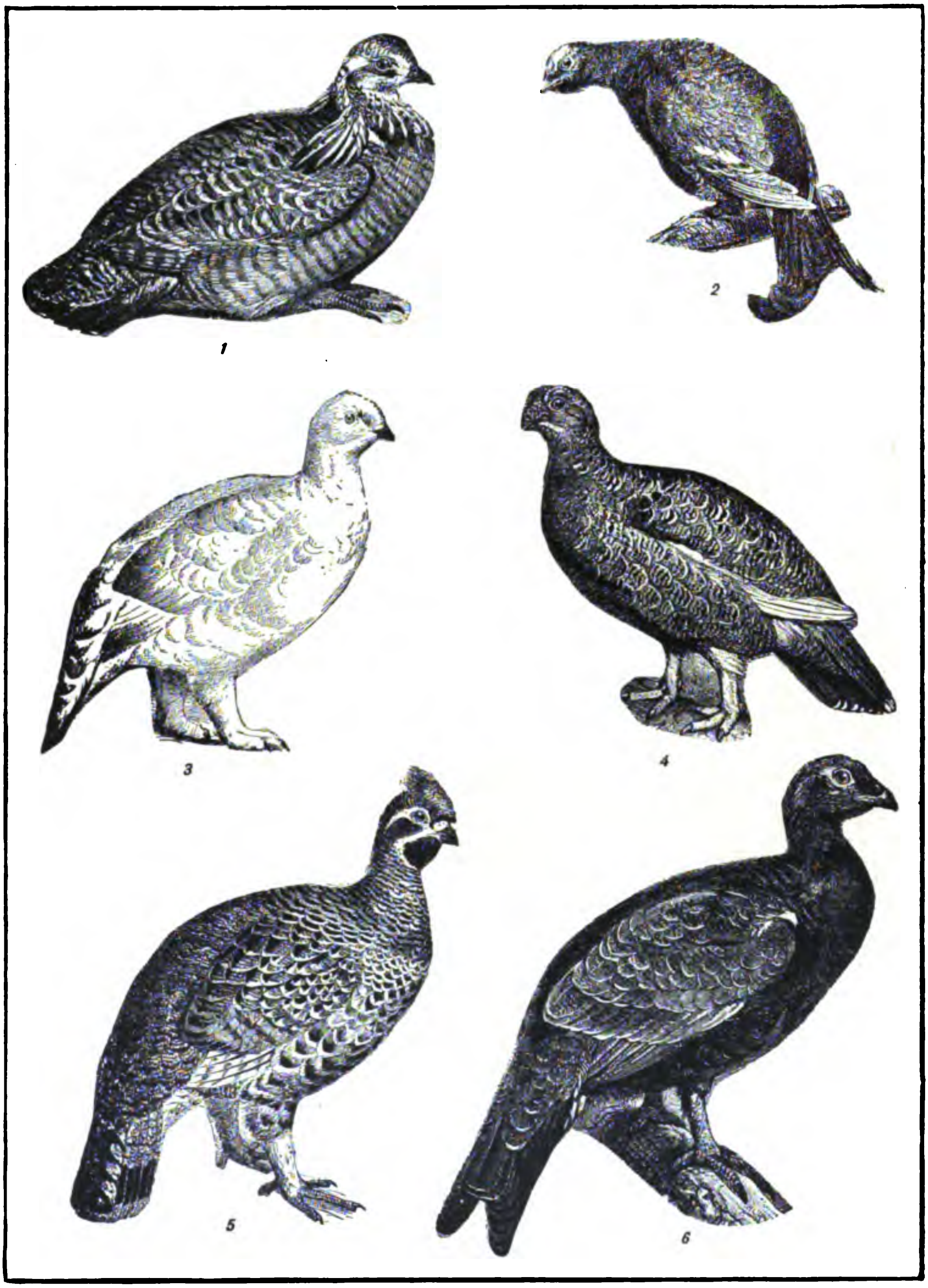
GROUSE, a family (*Tetraonidæ*) of gallinaceous game birds with feathered feet or tarsi, inhabitants of the northern hemisphere. In North America our best-known species is the ruffed grouse (*Bonasa umbellus*); the "partridge" of New England and the "pheasant" of the Middle States. This bird, in one or other of its races, ranges all across the continent from Canada to Washington and southward in the higher ground, and is one of our best esteemed game birds. The rumbling drumming of the male is a familiar sound in the woods in early spring, and is effected by rapidly beating the wings against the body. On the prairies of the Central and Western States are several varieties of pinnated grouse or prairie chickens (q.v.). In the Northwest occur the blue or dusky grouse (*Dendragapus obscurus*) and the sage grouse, the largest on this continent. In Canada and the northernmost part of the United States occurs the Canada grouse or "spruce partridge" (*canadensis*) with the allied Franklin's grouse (*C. franklini*) in the northern Rocky Mountains. The species to which the name grouse was originally applied, namely, the red grouse or moorfowl (*Lagopus scoticus*) of England, is the only bird absolutely restricted to the British Isles. It is plentiful in suitable parts of Wales and northern England, but is especially numerous in the highlands of Scotland, where it is bred and preserved on moorlands of great extent, large areas of which are kept barren of other occupation for this purpose. This, then, is the bird whose shooting, permitted for a period following the 12th of August, attracts so large numbers of sportsmen annually to Scotland for the "grouse-shooting." The sport may be followed in the ordinary method of shooting on the wing over dogs; but in many places is conducted as a battue. Grousemoors are owned and rented in large numbers, and have a status similar to that of deer-forests (q.v.). This grouse is a ptarmigan, other species of which exist in the Arctic regions. (See PTARMIGAN). Other European grouse of importance are the blackcock and capercailzie (q.v.). Among works dealing especially with grouse and grouse-shooting are Lloyd, 'Game Birds and Wildfowl of Sweden and Norway' (London 1867); the volumes on 'Shooting' in the 'Badminton Library' (London 1889); Alfalo, 'Sport in Europe' (London 1901); Sandys and Van Dyke, 'Upland Game Birds' (in the Sportsman's Library, New York 1902); Coues, 'Birds of the Northwest' (Washington 1874); Malcolm and Maxwell, 'Grouse and Grouse Moors' (1910).

GROUSSET, groo'sā', **Paschal,** French politician: b. Corte, Corsica, 1844; d. 1909. He was associate editor of *La Marseillaise,* a radical paper which strongly opposed the government; and this association subjected Grousset to repeated fines and imprisonments. For his share in the uprising of March 1871, he was deported to New Caledonia. Escaping to England, he became London correspondent of *Le Temps* for a few years. On his return to

GROUSE



1 Prairie Hen (Tympanuchus Americanus)
2 Blackcock (Tetrao urogallus)
3 Moor-hen or Ptarmigan (Lagopus albus) in winter dress
4 Scotch Red Grouse (Lagopus scoticus)
5 Ruffed Grouse (Bonasa umbellus)
6 Hybrid between Blackcock and Capercailzie

Paris Grousset re-entered politics and sat in the Chamber of Deputies in 1893, 1898, 1902 and 1906, representing the Socialist party. He also edited *L'Education Physique,* a journal devoted to the promotion of athletics and physical culture. His publications include political, autobiographical and travel sketches: 'Le bilan de l'année 1868'; 'La conspiration du général Malet'; 'Les origines d'une dynastie, le coup d'état de Brumaire an VIII' (1869); 'Les condamnés politiques en Nouvelle Calédonie' (with Jourde, 1876); 'La vie partout' (1884–88); and translations of Stevenson, Mayne Reid and other English authors.

GROVE, Sir George, English engineer, author and musical critic: b. Clapham, near London, 13 Aug. 1820; d. Sydenham, 28 May 1900. After completing his studies in the grammar schools of Clapham, he learned civil engineering, and for two years worked in Napier's factory near Glasgow. In 1841 he went to the West Indies, erecting in that year the Morant Point lighthouse in Jamaica, and in 1845 the Gibb's Hill light in Bermuda. He was appointed secretary to the Society of Arts in 1849, and in 1852 to the Crystal Palace. While in the latter position he exerted all his influence toward giving the music-loving public the best music obtainable, and endeavoring especially to create a taste for the compositions of Beethoven and of the German Romantic School. From 1868–83 he was editor of *Macmillan's Magazine,* and from 1878–89 edited the famous 'Dictionary of Music and Musicians.' In 1883 he was made the first director of the Royal College of Music, at the same time being knighted, and in 1894 was made a Commander of the Bath. He contributed to Smith's 'Dictionary of the Bible' (1864), and to Stanley's 'Sinai and Palestine' (1865). Consult 'Life and Letters,' by Graves (1903).

GROVE, Sir William Robert, English physicist: b. Swansea, 11 July 1811; d. London, 1 Aug. 1896. He was graduated at Oxford in 1832, began the practice of law in 1835, but eventually applied himself to the study of physics. He was elected professor of experimental philosophy to the London Institution 1840–47, and received the Royal medal from the Royal Society for his paper on the 'Gas Voltaic Battery.' Returning to the law he was knighted and made a judge of the High Court of Justice. He was one of the first to grasp the law of the "conservation of force." He is the author of 'The Correlation of Physical Forces' (1846).

GROVE CITY, Pa., borough in Mercer County, on the Pittsburgh, Bessemer and Lake Erie Railroad, 58 miles north of Pittsburgh. It contains a Carnegie library, a branch of the George Junior Republic and an Odd Fellows' Home. It is the seat of the Grove City College, a co-educational school opened in 1884. The chief manufactures are carriages, brooms, gas-engines, foundry products, motor trucks and machinery. The waterworks and electric-lighting plant are owned by the borough. Pop. 3,674.

GROVE CITY COLLEGE, a non-sectarian co-educational institution founded at Grove City, Pa., in 1884. The faculty numbers 31; the annual attendance of students reaches 1,015; the tuition fees are $87; living expenses range from $45 to $66. The productive funds are $81,802; total income including tuition and incidental charges $66,335. The college colors are crimson. There are over 13,000 volumes in the library. The number of graduates since organization is 1550.

GROVER, Lafayette, American politician: b. Bethel, Me., 29 Nov. 1823; d. 1911. He was educated at Bowdoin College and was admitted to the bar in Philadelphia in 1850, and settled in Salem, Ore., in 1851, where he became prominent in his profession and was made prosecuting attorney of the second judicial district and auditor of public accounts. In 1853 he was elected to the territorial legislature, serving there three years and being speaker in his last term (1856). He fought in the Indian wars in 1853 and 1855–56, and was later made United States commissioner to audit spoliation claims. In 1857 he was a member of the Oregon Constitutional Convention, and when Oregon was admitted as a State he was member of Congress (1858–59). He was chairman of the Democratic State committee (1866–70); served as governor of the State 1870–77, and was United States senator 1877–83. He was active in urging legislation to exclude Chinese from the United States. In 1886 he was elected to the Oregon house of representatives.

GROVETON, Va., Battle of. See Bull Run, Second Battle of.

GROW, Galusha Aaron, American statesman: b. Ashford (now Eastford), Windham County, Conn., 31 Aug. 1823; d. Glenwood, Pa., 31 March 1907. He was graduated from Amherst College in 1844, was admitted to the bar of Susquehanna County, Pa., in 1847, was elected to Congress in 1850 and was six times re-elected. During his first three terms he was a Free-Soil Democrat, during the last three a Republican. He was chairman of the Committee on the Territories in the 34th and 36th Congresses and speaker of the 37th Congress, whose five-weeks' session of 4 July–6 Aug. 1861 largely defined the government attitude toward the Confederacy and voted $500,000,000 for war purposes. He introduced the Homestead bill (see Homestead Laws) into the House, fought for it 10 years, finally obtained its enactment and signed it as speaker. In 1879 he declined the mission to Russia, in 1894 was elected from Pennsylvania as congressman-at-large, and was successively re-elected to the 54th, 55th, 56th and 57th Congresses. His plurality in 1896 was 297,446, the largest given up to that time in any State of the United States to a candidate for any office. He was also a delegate to the national Republican conventions of 1864, 1884 and 1892, and chairman of the Pennsylvania State Republican committee in 1868. In 1871–76 he was the president of the International and Great Northern Railway Company of Texas. His long record of conspicuous service is almost unparalleled in the political annals of the United States.

GROWING CROPS, Legal Status of. The farmer is frequently called upon to decide which products of his farm are real estate and part of the land and which may become personal property to be dealt with without regard to the ownership of the land. This division of the products of a farm involves the rights of purchasers, tenants and mortgagees, also creditors, heirs, executors, etc. A general rule may be given to the effect that growing crops follow the title to the soil in which they are rooted (Wootton v. White, 90 Md. 64; Jones v. Adams, 37 Ore. 473). When both belong to the same owner growing crops are a part of the land (Bagley v. Columbus So. R.R., 98 Ga. 626). If the land is sold growing crops pass by deed to the purchaser unless expressly reserved at the time of sale (Crews v. Pendleton, 1 Leigh 297; Gibbons v. Dillingham, 10 Ark. 9; Coman v. Thompson, 47 Mich. 22; Turner v. Cool, 23 Ind. 56). In case of a mortgage foreclosure sale, ungarnered crops pass to the purchaser of the land but those harvested before the sale is confirmed do not (Reilly v. Carter, 75 Miss. 798). Again in the case of a mortgage foreclosure sale, ungarnered crops pass to the purchaser even if there has been a previous sale or mortgage of the crop by the farmer to another party (Wootton v. White, 90 Md. 64; Jones v. Adams, 37 Ore. 473). The grant of a right to gather growing fruit may not be enforced against a new owner of the land unless it be in writing and recorded after the manner of a deed (Taylor v. Millard, 118 N. Y. 244). In an action for ejectment the successful plaintiff secures title to the growing crops on the land recovered by the decree (McGinnis v. Fernandes, 135 Ill. 69).

There are two classes of crops; those which grow without special care or cultivation, *fructus naturales,* and those which result from special cultivation, sowing, planting, etc., *fructus industriales.* The first, or natural products, such as timber, grass, etc., always remain part and parcel of the soil, and therefore, real estate, and do not become personal property until they are detached (Le Barron v. Babcock, 122 N. Y. 153). The industrial products, crops in the usual sense, oats, rye, potatoes, etc., are termed emblements, being the annual produce from seed sown — produced by labor and not spontaneously (Cottle v. Spitzer, 65 Cal. 456). Emblements are not real estate, but personal property (Westbrook v. Eager, 16 N. J. L. 81). They may be sold orally, as real estate may not be (Garth v. Caldwell, 72 Mo. 622). Before harvesting they are transferable like chattels (Harris v. Frink, 49 N. Y. 24; Delaney v. Root, 99 Mass. 548). As personal property, they belong to the tenant, not the landlord, and on the death of the owner of the land, pass to the administrator instead of the heir (State v. Crook, 132 N. C. 1053). In some States growing grain unreaped is classified as personal property. All crops become personal property when severed from the soil (Jones v. Adams, 37 Ore. 473). When a farm i. leased at a fixed rent, the crops grown and harvested during the term of the tenancy belong to the tenant. Difficulty arises, however, when the lease has expired, or the tenancy is terminated. State laws differ greatly here; in Michigan, if a farm is surrendered to the landlord while a crop is growing the tenant loses all right to the crop (Smith v. Sprague, 119 Mich. 148); in Delaware and Pennsylvania, the tenant in similar circumstances is entitled to the crop sown during the tenancy but not maturing until after the term has expired. Some States grant the landlord a lien for rent upon the crops grown upon leased land (Butt v. Ellett, 19 Wall. 544). A lien for rent attaches to the crops when the rent is payable in produce as well as when it is payable entirely in money. The purchaser of a crop from a tenant takes it subject to the landlord's lien, when such a lien is granted (Beck v. Minnesota & W. Grain Co., 131 Iowa 62). Other complications arise when crops are grown on shares. A partnership is not constituted by such an agreement between the owner of the land and a tenant. Owner and tenant of a farm leased for a term of years upon an agreement to divide the produce equally are tenants in common of the crops (Aiken v. Smith, 21 Vt. 172). If no special time for division of the crop is fixed, such a division is due when the crop is harvested and overdue after a reasonable time has elapsed since it was harvested. The principles enunciated above are very general and there exist great differences in the legislation of the several States on the subject. Other branches of legal rules touch the subject at several points, i.e., legislation in regard to real and personal property, mortgages, liens, etc. (qq.v.). Consult Green, J. B., 'Law for the American Farmer,' and Willis, H. E., 'The Farmers' Manual of Law.'

GROWTH, increase in size or volume. It may be divided into inorganic and organic growth. As an example of the former is the increase in size of minerals. Inorganic growth is not always process and hence inorganic growth is really a misnomer. Living beings or organisms grow by adding to the substances (protoplasm, etc.) forming their bodies similar matters as food, which are digested, assimilated and thus taken into the body of the plant or animal by interstitial deposit. Organic growth is thus fundamentally a physico-chemical process, a sort of synthesis of structuralized experience occurring in the growth mechanism. The result of this absorption of food is that the body increases in size, that is, grows. All growth is attended by movement; and growth-movements are, as Verworn states, common to all living bodies, but they take place so slowly that they can scarcely be followed with the eye. Growth goes on more freely and the size of the body increases most rapidly in those organisms in which the body presents a large raying surface, in distinction from the microscopic bodies of the one-celled plants or animals. The simplest phenomenon of growth is seen in cells, which during growth rapidly multiply by self-division, which causes the increase in volume in the embryo.

The physical agents or factors in the growth of plants and animals are abundance of food, together with the influences exerted by heat, light and other forms of energy. During growth the simple molecule of living proteid continually attracts elements to itself from the food (Hatschek).

Food and Chemical Agents.— As digestion and assimilation are chemical processes, they require certain materials to work with. These are called food. The elements which constitute food and which occur in protoplasm and flesh are carbon, oxygen, nitrogen, lime, phosphorus, potassium, sodium, chlorine, magnesium, sulphur, silicon and iron. All or any of these enter the body in various combinations, each playing a definite part in growth. Phosphorus is especially abundant in the tissues of embryos; potassium appears to be of great importance in imbibition, while iron is essential in the early processes of cell-division. Besides these inorganic substances, organic food, as flesh or vegetables, are essential to the growth of animals. Water is also essential and embryos develop most rapidly in moist places or in water.

Light.— Without light there would be no growth, indeed no life. Light may retard or hasten growth, under different circumstances. Young growing plants and embryos of animals need to be protected from too direct sunlight.

Temperature.— Organisms need sufficient heat in order to grow. The requisite amount for normal, maximum growth is called the optimum temperature, for at such a degree of warmth growth takes place faster than at any other. If the temperature be lowered, the rate of growth gradually diminishes; if the temperature be raised too much above the optimum, the rate of growth diminishes more rapidly. Excess of cold dwarfs both plants and animals.

Space and Movement.— If too much crowded, plants become slender and weak; snails become dwarfed if reared in too small vessels; mankind when confined to too narrow quarters in large cities tend to become undersized, from not having sufficient space and good air to live in; small trout live in small brooks and large ones in larger streams. All organisms need room to move or at least to grow.

Heredity.— Besides the factors already mentioned heredity has its share as an agent. Growth, development and reproduction are now in the plant and animal world proceeding as it were in grooves, or along more or less definite paths, in accordance with long established laws or relations, and the mechanism of growth is subject to heredity. Heredity is only thus another term for past experience of the race.

Growth and Longevity.— The elephant and whale attain a colossal size because they grow throughout life and live long. The large size of man as compared with many other mammals is due to the fact that he grows for a longer period; while many mammals get their growth in one, two or three years, man does not stop growing until he is 30.

It is to be observed that individual growth is not only dependent upon a suitable amount of food, but on proper environment and favorable conditions of life, and all these agencies also are the primary factors of organic life. It is the changes in the conditions of life, coupled with heredity and selection, that have caused the evolution of the world of plants and animals. Thus we see that the fundamental causes of the evolution of species are the same as those which determine the growth of any individual organism; we by no means understand all the phenomena of simple growth; there are unexplained laws and causes, as there are in general evolution; both in this respect are of a piece and are similar in their nature and results. The origin of species is as natural a process as the growth of the individual, and both in many respects are alike inexplicable by the science of the present day.

GROWTH AND DEVELOPMENT OF THE HUMAN BEING. In this article growth refers to an increase in size, and development to an increase in capacity. The body begins in a microscopic cell, and passes through the various stages of birth, growth, development, decline, and death.

The life of an individual may be studied in various periods, the embryonic and fœtal (which do not concern us at this time) and those of infancy, childhood, youth, maturity and old age. The above division is convenient, but not physiologically exact. The various periods are not sharply limited. From birth to maturity, with a gradual increase in size of various organs, there are progressive modifications of functions. Toward old age, decline begins and the modifications retrogress.

The Period of Infancy is variously limited by different writers, extending from birth to the end of the fourth, fifth, or even the seventh year, the last considered by law as the beginning of responsible life. Probably the best limitation is from birth to the end of the first dentition, about the end of the second year. At birth, connection with the mother suddenly ceases, and a new existence begins with the first inspiration. Then the vegetative functions, digestion, circulation, respiration, secretion, excretion and assimilation, are soon established. The infant performs all the functions of adult life except reproduction and volition. But in order to have them at their best they should be intelligently supervised by the parents. The young baby is the most helpless and dependent of all creatures. The care it receives influences its future life. With no care it must perish.

The period of infancy is characterized by frailty, active nutrition, rapid growth, and commencing development. It is especially prone to convulsions from improper food, or from high body temperature, whatever the cause, to rickets and scurvy from improper nourishment, to spasmodic affections such as false croup, to hydrocephalus, meningitis, whooping cough, diphtheria, diarrhœa, bronchitis, pneumonia, and to the eruptive diseases, measles, chicken-pox and scarlet fever.

The rate of infantile mortality is very high. From one-fourth to one-half of the children born in our large cities die within the first year; in small towns and in the country the rate is much lower Many of the new-born are enfeebled by vices of formation, such as cyanosis, spina bifida, hydrocephalus, or meningocele, by an hereditary syphilitic, scrofulous or tuberculous taint, or by chronic affections in the mother. All infants are exposed to the risks of an improper dietary, impure air and the extremes of heat and cold.

The bones of the infant are very vascular, quite elastic, have but little firmness, and their epiphyses are cartilaginous. They are therefore readily inflamed, as in scurvy, may be distorted by pressure, or incompletely broken by apparently slight injuries, or the epiphyses may be separated by such injuries. To forcibly lift a young child by one arm is always dangerous. The skull at birth is not fully ossified and can be readily compressed. The anterior fontanelle begins to close about the 9th month and is usually closed about the 18th. Depression of this fontanelle is one of the evidences of general debility. Premature closure of the skull is a cause of epilepsy or idiotism. The vertebral column is straight, lacking the curves of later life, and is quite flexible, but this flexibility tends to backward, forward or lateral distortions of the spine, as the result of rickets, inflammation (caries) of the vertebræ, or of sitting, standing or reclining in strained positions. Allowing infants (especially feeble ones) to sit, stand or walk too early tends to produce bow-legs and knock knees, as well as spinal deformities. It is many weeks before a baby can hold up its head. Even by the 12th week it is not properly balanced. It may be at the 16th. The first attempt to sit is about the 16th week, and sitting is accomplished about the 40th. About the 38th week, the child attempts to stand, and should be able to stand alone by the 11th or 12th month, and to walk unaided by the 15th or 17th month. Some children never creep. If they do, the attempt is made about the ninth month.

The muscles of an infant are soft and not capable of great effort. Not till after the sixth month are they felt firm and resisting. To develop them the clothing should be loose, and the child, in a nude state, should at times be allowed free play of them. To swathe the feet and limbs in bandages "to make the child straight" is hurtful.

The abdomen and chest (in its lower portion) are prominent, due to the very large liver, the small pelvis and the distention of the stomach by food, and to large size of the heart and lungs. All of these organs must have free movement, in order to carry on their important functions. Tight bandaging of chest or abdomen hampers movement and compresses important blood vessels. The size and weight of the heart of the new-born explains the rapid growth of the body and those organs in most direct communication with the heart, especially the brain. The small size and the vertical position of the stomach account for the ease with which infants throw up their food when the stomach is distended. Repeated acts of vomiting are injurious. The practice of jolting babies tends to produce vomiting. Each child must be studied by itself as to its powers of digestion, and what is the proper food for each. The substitution of artificial feeding for maternal nursing and the indiscriminate use of baby foods are responsible for much sickness and many deaths. But natural feeding is not always possible, owing to the dictates of fashion or the poor health of mother or child.

The nervous system of infants is very excitable, especially toward the end of the first year, and is out of proportion with the slow development of the inhibitory centres. Convulsions and spasmodic affections are therefore readily produced by various causes, such as undigested food, eruptive fevers, impure air, fright or excessive heat. Most of the movements and actions of early infancy are reflex, such as stretching, crowing and sighing, for example. About the fourth month evidences of will power appear and gradually increase. Good habits, as to regular times for feeding, sleep, etc., can often be inculcated at this early age, or even before, to the advantage of both mother and child. The brain is relatively large at birth and grows rapidly up to the seventh year, and after that time more slowly.

During this formative period care should be observed not to excite the brain unduly, else nervous disorders may result. Repeatedly urging a young child to "show off" is, to say the least, very unwise.

The senses of taste and smell seem to be partially developed at birth. After the third month the quick closure of the eyes on the approach of an object seems to indicate the establishment of true vision. A very bright light may be appreciated by the second or third day, or may be followed by the eyes, if moved slowly, after the sixth week. It is usually weeks before there are associated movements and convergence of the eyes. The eyes of the new-born frequently move independently of each other, producing "squint," but squinting in the course of a severe disease is a bad sign. As to colors, yellow, red, pure white, gray and black, in the order named, are said to be the first recognized, gradually after the sixth month.

All children are born deaf, but may notice sharp sounds six hours after birth, though usually not until a number of days. Toward the end of the first year the infant begins to imitate vocal sounds in its attempt to speak.

The circulation of blood is very rapid; the blood vessels are large and thin. Congestions, inflammations and hæmorrhages, therefore, are quite common. The pulse is irritable and slight causes disturb its rate and sometimes its regularity. The rate in the new-born is 130–140, during the first year 105–150 per minute, during the second 110–120, then gradually diminishes until at the fifth year it is about 90; from the 7th to the 14th year 80–90, and afterward 70–80. The respirations of the new-born are from 30 to 50 per minute, and at the end of the first year from 25 to 35. The breathing of healthy children is noiseless and through the nose. The habit of mouth breathing, usually caused by enlarged tonsils and by adenoid growths, is productive of deafness, change in facial expression and distortion of the chest (pigeon breast). The relatively small size of the pharynx, larynx and trachea frequently cause throat affections to be serious ailments in infants.

The average temperature of the infant is 100° F., but it is subject to many fluctuations. It is raised by ingestion of food, struggling, crying, etc., and lowered by sleep, inactivity and insufficient food. Sponging with cool water or oiling the skin will frequently lower a high body temperature, which, if unchecked, might cause convulsions.

In man there are two sets of teeth. The first or temporary teeth are 20 in number, 10 in each jaw. The first tooth appears about the seventh month, the last about the 24th month. The dangers of dentition are much exaggerated. Well-nourished children of healthy parents cut their teeth earlier, easier and more regularly than do feeble children. If the first tooth is not cut before the 14th month there is some serious defect. About the sixth year (and before the temporary teeth are shed) the jaws contain all the temporary teeth and all the rudimentary permanent teeth except the wisdom teeth. At birth, when the teeth have not appeared and in old age when they have disappeared the lower jaw is obtuse. During the growth of the teeth, the lower jaw increases in depth and length. To admit of these changes, the temporary as well as the permanent teeth should be taken care of and filled if need be. Food requiring mastication should not be given until there are several teeth. The permanent teeth are 32 in number, 16 in each jaw. The first one appears about the sixth year, the last from the 18th to the 24th or later. The thymus gland appears in the new-born, attains its full size by the end of the second year, then gradually diminishes until at puberty it has almost disappeared. It is supposed to be one of the sources of the red blood corpuscles.

For the first few months of life tears and perspiration are rare. After three months they are freer. In rachitic infants perspiration is often profuse. Up to the end of the first year the sebaceous glands are very active, especially upon the scalp. The saliva and pancreatic juice are small in amount until about the third month and therefore starchy foods cannot safely be given to young infants. The gastric secretion at birth can as a rule readily digest the casein of mother's milk, but has difficulty in disposing of other food. Mucus in the infantile intestines is copious, often ferments and may neutralize the feebly alkaline intestinal juices, and the pancreatic juice and saliva.

Both the small and large intestine are comparatively long, and digestion and peristaltic action are rapid. These facts, together with the small size of the stomach and the rapid growth of the body, require that the young baby be fed every two or three hours. The great length of the sigmoid flexure of the colon impedes the passage of fæces and induces constipation, which should be relieved by *light* laxative medicines or, better still, by change in the diet.

The lymphatic glands are numerous and large in the infant and the communication between them and the general system is more marked than at any other period of life. They are readily congested and enlarged in affections of the throat, scalp, etc., and in scrofulous and syphilitic ailments.

The average weight of the male new-born child is 7 lbs. 11 oz.; of the female 7 lbs. 4 oz. For the first few days there is a loss in weight, then the weight gradually increases. Generally it is doubled by the 5th month and trebled by the 12th in breast-fed infants; in hand-fed, later. Usually a healthy child gains 20 lbs. in weight and 10 inches in height in first two years of life; in the third year four pounds and four inches. During next six years there is an annual increase of four pounds and two or three inches; after the 10th year about eight pounds a year. About the ninth year in girls and the 11th in boys there is a diminution in the rate of growth, and at puberty (13th year in girls and 16th in boys) the activity of growth is the greatest. Between 12 and 15 girls grow heavier and taller than boys, but at 15 the boys again lead and maintain it through life. Growth usually continues to about the age of 25 in males and there may be a slight increase for 5 or 10 years afterward. Girls usually attain adult stature at about 21 years. Weight usually increases in the male and frequently in the female to the 50th or 60th year, due to an accumulation of fat.

The Period of Childhood may be said to extend from the end of the second year to puberty or youth. By the end of infancy the anterior fontanelle is closed, the temporary teeth are cut and the child is beginning to talk and walk, to use judgment and memory and to display independence. Childhood is characterized by active growth and development of the body and mind. Arrest of growth and loss of weight indicate malnutrition. On the other hand, while a very thin baby is abnormal, a very fat child or youth is, as a rule, one whose nutrition is at fault, or whose diet is too rich or generous.

The preparation of boys and girls for the duties and responsibilities of manhood and womanhood requires especially that their brains, muscles and digestive apparatus shall be strong. Nerve force must be stored not dissipated and coddling is wrong. Their nervous systems are normally very active and sensitive to impressions, hence nervous disorders and exhaustion are readily induced by overstimulation of the brain, through excitement, too much study, etc. Physical and mental training must go together. A vigorous child is almost constantly in motion, either at work or play, and this is as it should be. The same amount of exercise would exhaust an adult. It is well understood that systematic muscular exercise besides hardening the muscles improves the mental strength, that well-developed children take a higher rank in school than those of the same age less developed. Abundant out-of-door exercise also develops the co-ordinating power of muscles and the special senses, induces a greater respiratory range, better oxidation and an increased power of the heart. Thus nutrition is stimulated and a symmetrical development obtained. And this is just as necessary for girls as for boys. Children need sleep oftener and longer than adults. A healthy young baby sleeps nearly two-thirds of the time and a healthy child of seven will often sleep quietly for 12 hours or more. Disturbed sleep and sleeping with the mouth open indicate some nervous gastric or intestinal disturbance or the presence of enlarged tonsils.

After the first few years of life the special senses seem to acquire an acuteness more marked than in later life when the perceptions are associated with more complex mental processes. Children require much food and the diet should be nutritious, but overloading the stomach, especially with sweets and fruit, may excite general convulsions, vomiting, diarrhœa and alarming fever. A vigorous, healthy boy often eats, and may require about as much food as the average man. A variable appetite or the habit of eating mainly one class of foods is indicative of innutrition. A properly mixed diet is necessary for health. Sugar (candy, etc.), valuable in reasonable amount, should not be eaten in such quantity as to interfere with the appetite for regular meals. Children, especially those who eat but little sugar, should be taught to eat fat. In childhood the lymphatic system is still active, the glands readily enlarge as the result of irritation or of general disease, especially scrofula. The respiration in early childhood as in infancy is mainly diaphragmatic — the abdomen moves freely. The temperature normally is about 100° F. A sudden high temperature is much less significant than in the adult, so also is an increase in the rapidity of the pulse. Young children lose heat readily from the surface of the body, and are susceptible therefore to “taking cold” when insufficiently clad. The line should be carefully drawn between overdressing and the “hardening» process, and woolen garments except in the hottest weather are advisable.

Owing to the large amount of food consumed and the detritus resulting from the activities of the body — a free discharge of waste by the skin, kidneys and bowels should be facilitated by frequent bathing, the drinking of considerable pure water and the use of fruit, graham bread and green vegetables.

The stomach in children is straighter and more vertical than in adults, but less so than in infants. Vomiting is still easily produced. The small intestine is relatively much longer than in adults, due to the fact that much nourishment is to be digested.

Children are susceptible to nervous disorders such as chorea and certain forms of paralysis, and to whooping cough, mumps, measles, infantile paralysis or poliomyelitis, etc., which last are often classed as «children's diseases.» Spinal deformities are readily induced. Certain diseases, such as tuberculosis, are likely to affect a large number of organs at the same time. The recuperative power of a normally healthy child is very great, even in severe diseases.

The mortality of young children in general is enormous but decreases with age. It is greatest among those whose hygienic conditions are bad, who suffer from poor or insufficient food, impure air, etc. Diphtheria, scarlatina, measles, croup, pneumonia and intestinal disorders are the chief causes of death.

The Period of Youth, Adolescence or Puberty, is that period of life between childhood and maturity; in law, «that period from 14 in males and 12 in females till 21 years of age.» It occurs earlier in hot climates than in cold, is hastened by luxurious living and habits of idleness and is retarded by severe labor, hardship, privation and ill health. It is that period when the individual becomes fitted for reproduction by the development of the sexual organs. The voice is unsettled, due to a rapid general enlargement of the laryngeal cartilages and a lengthening of the vocal cords. Hair appears in the pubic region, in the axillæ and on the face in the male. In the female particularly, fat is rapidly deposited in the subcutaneous cellular tissue of the breast and extremities, adding to the comeliness of the form. The function of menstruation is established, preceded in a varying degree by headache, backache, physical and mental lassitude, palpitation, bleeding from the nose, nervous irritability and hysteria. Sexual maturity is evidenced by awakened sensibilities toward individuals of the opposite sex, of attraction, of repulsion or of timidity and shyness. In youth there is a pronounced development of the limbs, an increase in the size of the chest and a diminution in the size of the head and abdomen. The spine now forms a double curve, and the pelvis widens especially in the female. Mental faculties mature. A girl becomes a woman earlier than the boy a man.

Inasmuch as the rapid nutritive changes are prone to be attended by more or less grave disturbances of the nervous functions, it is essential, in order to have a sound mind in a sound body (that is, health), to carefully regulate physical and still more, mental exertion. The habit of self-control must be encouraged, and exaggerated language discouraged. School duties should not be imposed beyond, or even up to the limit of, tolerance of the individual, and social functions should not interfere with an abundance of sleep and outdoor exercise, else the result will be a wreck of the nervous system, and prolonged nervous and muscular prostration. Recklessness as to the laws of health are responsible for much of the sickness at this period of life. Purity of thought and action are great safeguards against the temptations which beset growing youth, which if yielded to impair or destroy both mind and body. Animal impulses are to be subordinated to aspirations of the mind. The continued fevers such as typhoid, severe inflammations, as pneumonia and acute rheumatism, tuberculosis and heart affections are the principal diseases of youth. Scarlet fever, measles and other eruptive diseases may affect the individual, but not commonly. Alcoholism is a dangerous condition, easily acquired. Neurotic conditions, especially in the female, too frequently occur.

The Period of Maturity begins at about the end of the 21st year, and extends in men to about the 60th, when the power of reproduction wanes, and in women to about 40 or 45, when the menopause occurs; the breasts and reproductive organs diminish and ovulation ceases. In women, at this time (as in the onset of puberty), the organic functions may be irregular; dyspepsia, palpitation, sweating, vertigo, neuralgia, irritability and melancholy may occur. The «change of life» is in reality therefore attended with a severe nervous shock. Manhood and womanhood begin when the individual has reached the full stature, when the skeleton is firmly ossified, the jaw is square, the chest fully expanded, and the limbs well developed. Gradually from this time onward in most instances, fat begins to accumulate, especially upon the abdomen, toward the end of maturity.

Popularly it is believed that man is in the «prime of life» from 35 to 50, but there are many instances of farmers, professional and business men and women being successful and at active work and in good health at 60 or more. The fact is, that the ability to do hard work, mental or physical, at an advanced age, depends upon habits of industry and method, and upon the care of the health which have been inculcated in earlier life and are continued into and through adult life.

Gradually as adult life advances, the inclination and sometimes the power for active exercise fails. These are evils to be guarded against. Outdoor games, horse-back riding, and vigorous walking, for example, may be pursued advantageously as a rule to 45 or 50 years of age. At about this time degenerative changes occur in the body and care is necessary that the heart and blood vessels be not overstrained. During the prime of life the body enjoys a maximum of vigor and power of endurance, and there is reason to believe that this is also true of the mind. But the self-consciousness of power that the individual possesses is frequently a menace, for it induces him to struggle for wealth or fame in the turmoil and bustle of modern life, to neglect recreation, to resort to alcoholics and other stimulants to keep up his energy, and to indulge in general high living. It is especially true at this time of life that no one should work up to the full measure of his ability. Such work is dangerous and has been responsible for the "breaking down" of the health and the death of many otherwise intelligent persons. The principal diseases of adult life are alcoholism, gout, cancer, urinary and venereal diseases, rheumatism, pneumonia, tuberculosis, affections of the brain and nervous system, of the heart and blood vessels and of the digestive system.

The Period of Old Age or Senility usually commences about the 60th year and is characterized by a waning of the vital powers and by atrophic and degenerative changes, the natural consequences of decay. While death frequently results from local accidents of the brain and nervous system (apoplexy, sclerosis, etc.) and of the heart, blood vessels and urinary organs irredeemably damaged in the course of decay, it is normally but the ending of a natural life, and not a pathological fact as in earlier life. The stature of the old is less, the shoulders rounded, bones are more fragile, the cartilages are hardened, the lower jaw resembles that of the infant, the chin is prominent, the skin is wrinkled owing to the absorption of fat, and loses its elasticity, the teeth decay and fall out, urination is frequently difficult, the respirations and heart beats are reduced in frequency, the arteries have a tendency to ossify, the veins to dilate. The muscles fail in their tension, the voice becomes a "childish treble," the digestion is weakened, the eye no longer sees clearly and hearing is dulled. The mind may preserve its freshness for a long time. Usually the senses fail first, next the faculties of memory, reason and volition. Toward the close of life the organic or vegetative phenomena prevail. The natural death occurs when the breath becomes fainter and fainter and the heart beats are weaker and fitful — and then gradually cease.

Old people require an abundance of sleep. They need also to be kept warm, for heat is generated in them in smaller amount than in robust health. Hence they are easily chilled. Food should be plain, largely liquid and that most easily digested. Exercise in the open air every day is desirable but it should be gentle in character. With these precautions old age may be made comfortable. See ADOLESCENCE; CHILD STUDY; CHILDREN, DISEASES OF; OLD AGE, DISEASES OF.

GRUB, the larva of an insect, especially of a beetle or fly. In reference to cattle it usually means the maggot of a flesh-fly or warble. See BOT-FLY; LARVA.

GRUB STREET, London, an old street near Moorfields, now known as Milton street, which was formerly inhabited by literary hack-writers. The adjective "grubstreet" has come to be applied, since the 17th century, as a term of disparagement to all sorts of needy and uninspired litterateurs.

GRUBB, SIR Howard, Irish optician and telescope-maker: b. Dublin, 28 July 1844. The largest telescope of his construction is the 27-inch of the Vienna Observatory. He was the first to suggest a movable floor for an observatory dome, which has been adopted in the dome of the great 36-inch telescope of the Lick Observatory. He was knighted in 1887, and since 1913 has been scientific adviser to the Commissioners of Irish Lights.

GRUBB, Thomas, Irish inventor of astronomical instruments: b. Kilkenny, Ireland, 1800; d. 1878. Among his principal inventions were the Melbourne Observatory reflector for photographing the moon, and various telescopes at the leading observatories. Greenwich Observatory uses several of his instruments. In 1864 Grubb was elected Fellow of the Royal Society; in 1870 of the Royal Astronomical Society; and he was also a member of the Royal Irish Society. His publications have appeared in the journals of these organizations.

GRÜBEL, Johann Konrad, German poet: b. Nuremberg, 3 June 1736; d. there, 8 March 1809. He was a saddler and harness-maker, and passed his youth in privation; but he possessed genuine poetic gifts, as shown in the pictures he has given of the lives and manners of his countrymen in the three volumes of 'Poems in the Nuremberg Dialect' (1802). Another volume appeared in 1808.

GRUBER, Hermann, Austrian clergyman and author: b. Kufstein, Austrian Tyrol, 5 Feb. 1851. He was educated in the State Gymnasium and Stella Matutina College, Feldkirch, and at Jesuit scholasticates in Germany, Holland, Austria and England. In 1868 he entered the Society of Jesus, was professor at Feldkirch in 1874–76 and was ordained to the priesthood in 1879. In 1881 he was appointed professor of philosophy in the Jesuit scholasticate at Lyons, which in that year was removed to Mold, Cheshire, England. From 1882 to 1899 he was employed in parochial and literary work in Belgium, Germany, Austria, and in 1899 was stationed at Stella Matutina College, Feldkirch. In 1896–97 he was one of the chief instruments in bringing about the exposure of Leo Taxil. He is an ardent opponent of freemasonry and compiled reports for the Anti-masonic Congress at Paris in 1909. His publications include 'Auguste Comte, Begründer des Positivismus' (1889; French trans. 1891; Italian, 1893; Polish, 1898); 'Der Positivismus' (1891; French trans. 1893; Italian, 1896); 'Leo Taxils Palladismus-Roman' (3 parts, 1897–98); 'Betrug als Ende eines Betrugs' (1897); 'Einigungsbestrebungen und innere Kämpfe in der deutschen Freimauerei seit 1866' (1898); 'Mazzini, Freimauerei und Weltrevolution' (1901; Italian trans. 1902). He contributed to Herder, 'Kirchenlexikon'; 'Staatslexikon der Görres-Gesellschaft' and the 'Catholic Encyclopedia,' etc.

GRUBER, grụ'ber, **Johann Gottfried**, German author: b. Naumburg, on the Saale, 29 Nov. 1774; d. 7 Aug. 1851. He studied at Leipzig, and in 1811 was appointed professor at the University of Wittenberg, and in 1815 professor of philosophy at Halle. His chief work was that of editing, first with Ersch, and after his death, alone, the first section of the 'Universal Encyclopædia.' His independent works include 'Herder's Characteristic' (1805); 'History of the Human Race' (1805); and Lives of Wieland (1815–16), and Klopstock (1832); he also edited 'Wieland's Complete Works' (1818–28).

GRUGRU, the grub or larva of *Calandra palmarum*, an insect of the family Rhyncophoræ, inhabiting Guiana and other tropical parts of America. The fully developed insect reaches a length of about an inch and a half. The grub is of grayish white about two inches long and one-half inch in diameter and makes its home in the Cabbage Palm, feeding on the soft parts. It is a choice morsel of food for both Indians and whites and is prepared by roasting. To procure them it is necessary for a man to climb the palm and cut them out of the wood near the crown of the tree.

GRUGRU PALM NUT, the nut of certain West Indian and South American palms (*Acrocomia lasiopatha* and *A. sclerocarpa*). The nut is not much larger than an apricot and contains a hard pith and an edible pulp. Oil is extracted from the piths and is known commercially as Mocaya oil.

GRUIĆ, groo'ich, **Sava,** Serbian statesman: b. Kolare, 1840. He fought during the Serbian War with Turkey (1876), and rose to be Minister of War during the Russo-Turkish War of 1877. He also acted as first Serbian Minister to Bulgaria in the same year; after which he returned to Belgrade and played an important rôle in the politics of his country. Gruić was repeatedly elected to the office of Premier, was Ambassador at Constantinople (1889–93 and 1900–03), and again Premier (1903–04). The formation of the Balkan alliance called forth his best diplomatic efforts.

GRUMBKOW, grọmp'kō, **Friederich Wilhelm von,** Prussian general: b. Berlin, 1678; d. 1739. After studying at Utrecht and Leyden, he entered the military and diplomatic service and rose to be head of the War Department of Prussia under Frederick William I. His vigorous internal policies did much to strengthen the status of the army and the civil government.

GRUMENTUM, Italy, an ancient Lucanian town, 33 miles south of Potentia. It was situated according to Holste on the right bank of the Agri River, one-half mile south of Saponara. On this site were discovered ruins of an amphitheatre, a theatre, thermæ and a portico, dating from the 1st century B.C. Historically Grumentum is interesting as the scene of the defeat of Hanno, the Carthaginian general (215 B.C.) and as the headquarters of Hannibal (207 B.C.). Later, a Roman colony settled there, probably in the time of Sulla.

GRÜN, Hans Baldung. See BALDUNG, HANS.

GRUNBERG, Germany, capital of the circle of Grünberg in the Prussian province of Silesia; on a tributary of the Oder, 15 miles east of Giessen. It is surrounded by vineyards, and large quantities of wine are made here and in the vicinity. There are manufactories of cloth, thread, carpets, glass, rope, twine, paper, brandy, machinery, bridge materials. Lignite is mined in the district. Pop. 23,168.

GRUND, grọnt, **Franz Friedrich Alexander,** German engineer: b. Heinrichau, Silesia, 1814; d. 1892. He studied at Breslau and Berlin, and then entered the government engineering service. He was first appointed as inspector of hydraulic engineering in the Rhine Province; and then became a member of the Prussian Ministry in the capacity of advisory counsellor. Among his principal achievements are the plans for the canal connecting the Rhine and the Meuse, the harbors at Emmerich, at Oberlahnstein, and the widening of the harbor at the confluence of the Ruhr and the Rhine.

GRUNDTVIG, groont'vĭg, **Nikolai Frederic Severin,** Danish theologian, historian and poet: b. Udby, island of Seeland, 8 Sept. 1783; d. Copenhagen, 2 Sept. 1872. He was educated at the University of Copenhagen, and in 1822 went to Copenhagen as chaplain. He made a fierce attack on the rationalism of the time in his ‹The Answer of the Church› (1825), a reply to Professor Clausen, and for the violent expression of opinion in this work was severely censured and resigned his position. For a time he devoted himself to literary work, and through his writings exercised a great influence on the religious and political thought of Denmark. In 1839 he became pastor at the hospital church of Vartow, Copenhagen, and held that position till his death, being made a bishop in 1861. He was for a time a member of the Danish diet, and took an active part against Germany and German influence. His most important work is ‹Northern Mythology›; he also wrote a number of poems, among them some very popular national songs, and translated ‹Beowulf.›

GRUNDTVIG, Svend Hersleb, Danish philologist: b. Copenhagen, 9 Sept. 1824; d. there, 14 July 1883. He was the son of the preceding, and like his father, became very much interested in the study of the folk lore and language of his native country. He taught at the University of Copenhagen in 1863, and three years later succeeded to the chair of Scandinavian philology there. He translated English and Scottish ballads (1842–46), but his greatest contribution to literature was his ‹Danmarks gamle Folkeviser› (1853–83).

GRUNDY, Felix, American jurist: b. Berkeley County, Va., 11 Sept. 1777; d. Nashville, Tenn., 19 Dec. 1840. Studying law he was admitted to practice in 1798, and soon acquired a high reputation as an advocate in criminal cases. He was a member of the Tennessee legislature 1799–1806, and in the latter year was appointed one of the judges of the supreme court of errors and appeals. In 1811 he was elected representative to Congress, and reelected in 1813. In 1829, and again in 1833, he was elected to the Senate of the United States, where he was among the most prominent of the supporters of President Jackson. In 1838 President Van Buren appointed him Attorney-General of the United States; but in 1840 he resigned that office, and was re-elected to the Senate.

GRUNDY, Sydney, English dramatist: b. Manchester, 23 March 1848; d. 4 July 1914. He was called to the bar in 1869 and practised till 1876, but afterward became known at home, and in the United States, as a successful playwright.

GRUNDY, Mrs., a personage constantly appealed to in the phrase, ‹But what will Mrs. Grundy say?› in Morton's play, ‹Speed the Plough› (1800), but who never appears among the *dramatis personæ*. The phrase has now come to stand for the judgment of society in general upon actions or conduct.

GRUNER, groo'nẽr, **Justus von,** Prussian politician: b. Osnabruck, 1777; d. 1820. After studying law at Holland and Göttingen, he became president of the police department at Berlin. The efficient service which he rendered there won for him the appointment of head of the entire police force of Prussia. He resigned after the Franco-Prussian Alliance was made and went to Prague where he organized the national defense system of Germany. He was governor-general of Berg in 1814; chief of police at Paris during the allies' occupation, and Prussian ambassador to Switzerland from 1816 until his death.

GRUNER, Wilhelm Heinrich, German engraver: b. Dresden, 1801; d. there, 1882. He studied under Klingen and Krüger at Dresden and under Longhi and Anderloni at Milan. He spent several years at Rome (1837–41) and at London (1842–56). On his return to Dresden he became director of the Cabinet of Engraving, which office he held until his death. His principal engravings consist of those after the mosaics of the Chigi Chapel (1839); ‘Decorations of the Garden Pavilion of Buckingham Palace’ (1846); and ‘Specimens of Ornamental Art’ (1850); ‘Cathedral of Orvieto’ (1858); ‘Luini's Decorations of Santa Maria delle Grazie, Milan’ (1859–60); ‘Das grüne Gewölbe zu Dresden’ (1862); ‘Terra-Cotta Architecture of Northern Italy’ (1867); and several separate engravings after Raphael and Overbeck.

GRÜNEWALD, Matthäus, German painter: b. probably in Frankfort; settled in Aschaffenburg, where he was employed by the Archbishop Albrecht of Mayence. He seems to have died about the year 1530, and to have been, after Dürer and Holbein, the greatest German painter of the period, though but little of his life is known. His most important work is an altar-piece of six panels, which was executed for the church of Saint Maurice and Mary Magdalene at Halle, but afterwards transferred to the church of Saints Peter and Alexander at Aschaffenburg. It is now in the Munich Gallery. The centre picture represents the ‘Conversion of Saint Maurice by Saint Erasmus’; and the wings contain the figures of Saint Lazarus, Saint Mary Magdalene, Saint Martha, Saint Chrysostom and Saint Valentinian. There is another work in the church of Our Lady at Halle, of which the centre picture, representing the ‘Virgin in Glory,’ the inner sides, and perhaps the outer sides, are assigned to Grünewald. A ‘Rosary’ in the chapel of Saint Anthony in the cathedral of Bamberg, and the wings of altar-pieces at Heilsbronn, in Franconia, and at Annaberg, Saxony, are also assigned to this master.

GRÜNHAGEN, Kolmar, German historian: b. Trebmitz, 1828; d. 1911. He studied at Jena, Berlin and Breslau. In 1855 he taught history at Breslau; from 1866–1901 was professor there and was in charge of the governmental archives for a number of years. His publications include ‘Breslau unter den Piasten als deutsches Gemeinwesen’ (1861); ‘Friedrich der Grosse und die Breslauer, 1740–41’ (1864); ‘Die Hussiten Kämpfe der Schlesier’ (1872); ‘Geschichte Schlesiens’ (1884–86); ‘Schlesien unter Friedrich dem Grossen’ (1890–92).

GRUNT, or **CROAKER,** a drumfish (q.v.).

GRUPPE, groop'pę, **Otto Friedrich,** German scholar: b. Danzig, 1804; d. 1876. He received his education at Berlin and then followed the profession of journalist. In 1835 he became editor of the *Preussische Staatszeitung* and in 1842 became a member of the Ministry of Education. Two years later he succeeded to a chair of philosophy at Berlin. Besides several philosophical works ‘Antäus’ (1831); ‘Wendepunkt der Philosophie in 19ten Jahrhundert’ (1834); ‘Gegenwart und Zukunft der Philosophie in Deutschland’ (1855) he is the author also of classical studies: ‘Ariadne’ (1834); ‘Die römische Elegie’ (1838); ‘Minos’ (1859); and ‘Æakus’ (1872); and several poetical, dramatic and critical works.

GRUSCHA, groo'shä, **Anton Joseph,** Roman Catholic prelate: b. Vienna, 1820; d. 1911. He was ordained in 1843 and eight years later became professor of religion in the Theresianum. He was preacher at Saint Stephen's (Vienna) in 1855; Privy Chamberlain to the Pope (1858); canon of Saint Stephen's (1871); Apostolic Field Vicar of the Army and Bishop in partibus of Karrhä (1878); and eventually became Archbishop of Vienna (1890) and Cardinal in the following year. He published ‘Handbuch der katholischen Religionslehre für höhere Lehranstalten’ (1851).

GRUSON, groo'sŏn, **Hermann,** German inventor and manufacturer: b. Magdeburg, 13 March 1821; d. 1895. He studied at Berlin; became chief engineer of the Wöhlert machine shops in Berlin in 1851, and in 1854 went to Buckau as director of the Hamburg-Mecklenburg steamship company. There he established a shipyard of his own and built a small iron foundry, where he invented a process of chilled cast iron, which was much used in the manufacture of machinery, as well as for armor. His establishment consequently grew rapidly, and in 1886 was incorporated, manufacturing armor for most of the states of Europe. Gruson was manager of the company until July 1891, when he retired and devoted himself mostly to study and experiments in physics. In 1893 the works were sold to Krupp.

GRUTER, gru'tėr, or, **GRUYTERE, Jan,** Belgian scholar: b. Antwerp, 1560; d. Heidelberg, 1627. He was educated at Cambridge and Leyden and became professor of history at Heidelberg in 1592. As librarian at that university he was in charge of the Palatine collection of books, which were removed to Rome to avoid destruction when the city was besieged by Tilly (1622). His publications include ‘Lampas sive Fax Artium Liberalium’ (16th century essays, 7 vols., Frankfort 1602–34); ‘Inscriptiones Antiquæ Totius Orbis Romanorum’ (2 vols., Heidelberg 1603, and again 7 vols., 1707, with an index by Joseph Scaliger).

GRÜTLI, or **RÜTLI,** Switzerland, a tract of meadow land in Canton Uri, on the western shore of the Lake of Uri. It is famous as the place where the revolt against Austria was first planned. It is preserved as a national park and contains a monument erected in 1884 to honor the event of Switzerland's emancipation.

GRÜTZNER, grüts'nĕr, **Eduard,** German painter: b. Gross Karlowitz, Schlesien, Germany, 26 May 1846. He began the study of art without a master, and his talent having been recognized by the architect, Hirschberg, he was taken by the latter to Munich 1864. He was there admitted to the school of Piloty. He first appeared before the public as a humorous painter, Shakespeare's Falstaff being his favorite subject. He is, however, known all over the world for his pictures of monks, in the cellar, tailor's shop, kitchen, etc. Well-known also is his 'Mephistopheles Behind the Scenes in the Dressing Room of a Ballet Dancer.' Other works of note are 'The Drinker and the Devil,' 'Convent Peace' and 'Don Quixote' in the Pinakotheck; 'The Convent Library,' at Dresden; 'The Convent Kitchen,' at Königsberg, and series of cartoons entitled 'Falstaffiade,' in the Breslau and other museums.

GRUYÉRE, grü-yãr', Switzerland, district of Canton Fribourg in the Sarine valley. The capital is Bulle, which contains an interesting old castle, dating from the 13th century. The principal industries are cattle raising, agriculture and cheese-making. Pop. of Bulle, 3,500; of district, about 25,000.

GRUYÉRES, Switzerland, a town in the district of Gruyère, 16 miles southwest of Fribourg, on the left bank of the Sarine. It was the seat of the counts of Gruyère, whose old castle, dating from the 10th century, still stands. Pop. 1,500.

GRYLLIDÆ, grĭl'ĭ-dē, a family, the crickets, of saltatorial orthopterous insects, distinguished from the grasshoppers and locusts by the fact that the tarsi are three-jointed and the ovipositor, when exserted, is spear-shaped; the wings, when present, fit closely to the body. The family includes three types: (1) the true crickets, such as the common field cricket, or the hearth cricket of Europe, which are of the genus *Gryllus*; (2) the burrowing, curiously modified mole-crickets (q.v.); (3) the tree-crickets, pale-colored nocturnal forms, which lay their eggs in the twigs of different plants and which sometimes are so abundant that by their egg-laying alone they do considerable damage to vineyards and to raspberry and blackberry plantations. The black field-crickets, of which the commonest American species is *Anabrus simplex*, inhabit burrows in the ground and come abroad to feed on grass and herbage at night and sometimes in daylight. They deposit eggs in the ground in the autumn, but these do not hatch until the following spring.

GRYPHIUS, Andreas (Greif), German poet: b. Grossglogau, Silesia, 11 Oct. 1616; d. 16 July 1664. He was left an orphan at an early age and received his classical training at Fraustadt. He became tutor in the family of the jurist, Georg von Schönborn, who recognized Gryphius' talents, conferred on him the diploma of master of philosophy and a patent of nobility. After his patron's death, in 1637, Gryphius went to continue his studies at Leyden, where he remained until 1643. He traveled throughout Europe until 1647 when he settled at Fraustadt. Here he began his dramatic work and in 1650 was made syndic of Glogau. His comedies 'Absurda Comica, oder Herr Peter Squentz' (1663); 'Die Geliebte Dornrose' (1660) are his best works. He also wrote five tragedies: 'Leo Armenius' (1646); 'Carolus Stuardus' (1649); 'Katharine von Georgien' (1657); 'Cardenio und Celinde' (1657); 'Papinianus' (1663). He also wrote several lyrics which reflect the melancholy of his early years. Consult Mannheimer, V., 'Die Lyrik des Andreas Gryphius' (Berlin 1904) and Hermann, J., 'Uber Andreas Gryphius' (Leipzig 1851).

GRYPHON. See Griffin.

GUACHARO, gwa-cha'ro, **OIL BIRD,** or **FAT BIRD,** a remarkable South American bird (*Steatornis Caripensis*), the only surviving member of the Steatornithidæ. They are nocturnal in habits, have a strong bill and are frugivorous. They are about as large as the crow and closely resemble the nightjars in plumage, which is brownish gray with small black streaks and dots. They spend the day in deep and dark caverns, where great numbers congregate and make their nests. Humboldt gives an interesting account in his 'Personal Narrative' of a visit to the great Guacharo cavern in the valley of Caripe, near Cumana. This cavern is visited once a year for the sake of the fat of the young birds, which soon after being hatched become almost a mass of fat, and which are slaughtered in great numbers, and their fat melted and stored for use as butter or oil. The clarified fat is half liquid, transparent, inodorous and will keep for a year without becoming rancid. Consult Newton, 'Dictionary of Birds' (New York 1893–96).

GUADALAJARA, gwä-dä-lä-hä'rä, Mexico, capital of the State of Jalisco, and second only in population and importance to the city of Mexico, from which it is 380 miles distant by the line of the Mexican Central Railway. Its altitude above sea-level is 3,600 feet. The city possesses a great advantage in the nearby Falls of Juanacatlan which supply electric power for its industries, street railway and lighting. In recent years Guadalajara has become a very important mining centre or headquarters for a district in which are many valuable properties, now being developed. Guadalajara is noted for its beautiful pottery and skillfully wrought "retratos" or figures in clay, and its drawn work. In the immediate vicinity is an inexhaustible deposit of clay the elastic qualities and pleasing color of which especially adapt it to the two purposes first above mentioned. Among other industries are manufactories of cotton goods, twine and cordage, paper and leather articles. The hospitals include a Civil Hospital for both sexes, a Military Hospital, the Hospital of the Sacred Heart, for women, the Hospital Guadalupano, also for women, and the Beata Margarita Hospital and Santissimo Trinidad Hospital for men. The city's educational facilities include a college of law, a college of medicine, a normal school, a young ladies' seminary, a lyceum, a high school, and a number of primary schools. The cathedral, or most notable church of the city, is one of the grandest in the Republic, architecturally and in its dimensions, decorations and ornamentation. The penitentiary of the state, an imposing structure, is located here, as also the various other public institutions. Located in the city are two public libraries,— the State Library, with over 50,000 volumes,— and the Seminary Library of 24,000 volumes; an Industrial Museum, a theatre, and the Governor's Palace. The principal public parks, some of which are exceptionally beautiful, are the Alameda, Plaza de Armas, Botanical Garden, Alcalde Park and the Calzada de San Pedro. The banking facilities are supplied by the Bank of Jalisco, the Guadalajara Banking Company, and branches or agencies of the National Bank, and the Bank of London and Mexico, of

Mexico City; the Bank of Aguascalientes, and the Central Bank, of Mexico City. Pop. 119,468.

GUADALAJARA, Spain, capital of the province of the same name, 35 miles east northeast of Madrid on the Madrid Saragossa Railway. It is on the left bank of the Henares River. It is a very old town, dating from Roman times, when it was known as Orriaca or Caraca. A Roman bridge and aqueduct still survive. Other interesting ancient structures are the palaces of the Mendozas; their mausoleum; several churches, including the famous old one of San Franciso, and the town and provincial halls. There is also a college of engineers, housed in a building erected in the 18th century by Philip V for a cloth factory. Guadalajara was captured by the Moors in 714 but was retaken by Castile in 1081. The chief industries are the manufacture of woolen goods, bricks, soap and leather. Trading is carried on in salt and agricultural products. Pop. of the district, 214,141; of the town, 12,250.

GUADALCÁZAR, gwä-dal-ká'sär, Mexico, a town in San Luis Potosí province, 45 miles northeast of San Luis Potosé. It is the centre of a quicksilver mining district. Pop. 7,500.

GUADALQUIVIR, gä″dăl-kē′vēr, Spain, a river of the southern part, second in importance to the Ebro. It takes its rise between the Sierra de Cazorla and Sierra del Pozo in the eastern part of the province of Jaén, at a height of 4,475 feet above sea-level. It flows southwest, and is joined by the Guadianamenor and Guadalimar, and later by the Jenil. After a course of about 355 miles it empties into the Atlantic Ocean. It drains a wide level area for the most part. Two islands, Isla Mayor and Isla Menor are located in the river below Seville. At its mouth are the great marshes, Las Marismas. The full stream of the river continues at all seasons, the supply coming from the winter rains and, in the summer, from the melting snows from the Sierra Nevadas. There are numerous towns along its course, and the two important cities of Cordova and Seville. It is navigable as far as Seville to ships of 1,200 tons.

GUADALOUPE-HIDALGO, gä-dä-loo′-pā-ē-däl′-gō, a town in the federal district of the United States of Mexico, three miles north of the city of Mexico. The treaty of peace between the United States and Mexico was signed here 2 Feb. 1848.

GUADALUPE-HIDALGO, Treaty of, 2 Feb. 1848; the treaty which closed the Mexican War. While the war was in progress, Polk sent Nicholas P. Trist of Virginia, then chief clerk of the State Department, to negotiate a treaty of peace; the conditions to include the cession of Upper and Lower California and New Mexico and the Rio Grande for boundary between Mexico and the United States. Trist went to Scott's headquarters, an armistice was arranged, and in August 1847 the three Mexican commissioners and Trist met and exchanged proposals. The former would not yield to such terms, demanded the Nueces as the boundary (giving them Corpus Christi and a large triangle at the south), and offered much less other territory. Trist was recalled, but remained at headquarters; Santa Anna declared that he was tricked in the proposals, war operations went on, and the city of Mexico was captured not long after. In January 1847 negotiations were resumed, Trist still acting as principal, and the treaty above was agreed on. The Senate, however, refused to accept it, and insisted on harsher terms; Mexico was forced to accept them, and the Senate ratified the treaty 10 March. Formal proclamation was made 4 July 1848. The land cession was of Upper California and New Mexico, and the Rio Grande was made the boundary. The United States paid Mexico $15,000,000, and assumed $3,250,000 of claims made by United States citizens against Mexico prior to the treaty, besides any claims to which under the conventions of 1839 and 1843 Mexico was adjudged liable. Of the 252 claims put in under this treaty, 182 were finally allowed. See MEXICAN WAR.

GUADALUPE RIVER, Texas. Its source is in Kerr County, whence it flows in a southeasterly direction into San Antonio Bay. It is joined by the San Antonio River about 20 miles from its mouth, where it also divides. The total length is about 250 miles. The principal towns along its banks are New Braumfels, Seguin, Gonzales, Cuero and Victoria, which marks the extent of the river's navigability to steamers.

GUADELOUPE, gâ-da-loop′ (Fr. gwäd-loop), West Indies, an island (or twin-islands, strictly speaking) of the inner chain of the Caribbees. (See ANTILLES). It lies in lat. 15° N. and long. 61° W. and, with its dependencies, has an area of 688 square miles. A strait divides it into two parts, called Basse-Terre and Grande-Terre. The former is very mountainous, and its volcanic character was manifested most impressively by the eruption of La Soufrière in 1797 and the disastrous earthquake in 1843. The eastern division, or Grande-Terre, on the contrary, is a calcareous plain, which at no point attains an elevation of more than 450 feet. The mean temperature of Guadeloupe is 78° F., the maximum being 101° and the minimum 61°. Of the total area 32 per cent is under cultivation. The cultivated portion is divided among the important crops as follows: Sugar cane, 49 per cent; provisions for local consumption, 28 per cent; coffee, 10½ per cent; cocoa, 7 per cent; and the remaining 5½ per cent is given over to vanilla, lime trees, etc. The soil is fertile, and the rain fall is usually sufficient for the needs of the crops. The dependencies referred to above are the adjacent islands Marie Galante, Les Saintes, Désirade, Saint Barthélmy and Saint Martin. The chief products are sugar, coffee of the finest quality, rum, vanilla and cocoa. In 1917 the total trade of Guadeloupe amounted to $17,000,000 an increase of 94 per cent over 1912, and 31 per cent over 1916; the value of the exports was $9,454,550; imports from the United States amounted to $7,625,662, the chief items being, flour, rice, breadstuffs, fish, oil, vegetables, cement, fertilizers, etc. Revenues approximate $934,000 (or 4,670,290 francs in the local budget of 1915); expenditures, including the appropriations made by France from time to time, are somewhat in excess of that sum. Guadeloupe is a department of France, represented in the French chambers by one senator and two deputies. Its local interests are directed by a governor and a general legislative assembly of 30 members. There are 114 elementary schools, with 14,226 pupils, one lycée, with 301 pupils and a secondary school for girls, with 130 pupils (statistics of 1913–14). The chief seaport, Pointe-à-Pitre (22,664 inhabitants), is situated on the eastern side of Basse-Terre. Several times its buildings have been destroyed or severely damaged by earthquakes. Le Moule, the principal town of Grande-Terre, resembles Pointe-à-Pitre in size and situation. There is a fortnightlv passenger service between France and Colon, Panama, the steamers of this service call on the outward and homeward voyages at the ports of Basse-Terre and Pointe-à-Pitre. A small steamer also makes monthly trips between Martinique, Guadeloupe, Saint Thomas, Porto Rico, Haiti and Santo Domingo. There is also a fortnightly service between Gaudaloupe and New York. There is a wireless telegraph station at Pointe-à-Pitre. After the discovery, Gaudeloupe belonged to Spain until 1635; in that year it was taken by the French; in 1794 England seized it, freed the slaves, and retained possession until 1802; then it passed again into French hands, together with Martinique, England taking Saint Lucia in exchange; the restoration of slavery by the French was resisted by the negroes, and was attended with great suffering and loss of life; for a brief period in 1810 England once more held Guadeloupe, but returned it to France; emancipation was declared in 1848. Total population 212,430 (3,460 French born and 12,306 foreigners). Consult ‹Annuaire de la Gaudeloupe et Dépendences› (Basse-Terre).

GUADET, gwä'dā', **Marguerite Elie,** French revolutionist: b. Saint Émilion, 20 July 1758; d. Bordeaux, 1794. He studied law and in 1790 became administrator of the Gironde and was appointed to the Legislative Assembly in the following year, representing the Girondists. A staunch supporter of the constitution of that year, he opposed all measures attacking it, and through his vehement espousal of the Girondist cause came to be president of the assembly. While he was serving in this capacity, the uprising of the 10th of August occurred. Guadet was re-elected to the convention of 1792, and cast his vote at the trial of Louis XVI for an appeal to the people and the death sentence. When the Girondist party was overthrown, Guadet's career came to an end. He managed to evade the warrant issued for his arrest for a time, but was finally captured at his hiding place at Saint Émilion and guillotined at Bordeaux. Consult Guadet, J., ‹Les Girondins› (Paris 1889).

GUADIANA, gwä-thē-ä'nä, a river of Spain and Portugal, which rises in the plateau of New Castile, flows first northwest, then circuitously southwest into and across Estremadura, and on reaching Badajoz turns southwest and forms part of the boundary between Spain and Portugal. Entering Portugal it flows past Monsaraz, Moura, and Serpa, to Mertola, again forms the boundary between the two kingdoms, and falls into the Atlantic between Castro Marim on the Portuguese, and Ayamonte on the Spanish side. Its course is about 515 miles, of which only 35 are navigable. Its chief tributaries are the Gigüela, Bullaque, Valdehornos and Rubial on the right, and the Azuel and Jabalon on the left.

GUADIX, gä-dēs', Spain, a city on the river of the same name in the province of Granada 35 miles northeast of Granada. There is an interesting old Moorish castle and a cathedral. Guadix is also the seat of a bishop. The chief industries are the manufacture of brandy, pottery, building materials, hemp and hats; and trade in cotton and corn. Pop. about 14,000.

GUADUAS, gä-doo'ạs, Colombia, city in the department of Cundinamarca, 53 miles northwest of Bogotá. The town dates from the early 17th century, when a mission was established there by a monk. The principal manufactures are leather goods and hats. Coffee, sugar and asphalt are produced in the neighborhood. Pop. about 9,000, chiefly Indians or half-breeds.

GUAGUA, gwä'gwạ, Philippines, a pueblo of the province of Pampanga, island of Luzon, on one of the main channels of the Pampanga delta, three miles southwest of Bacolor. It is the port for Bacolor, has steamboat communication with Manila, and has an extensive business in groceries and drugs. Pop. 11,028.

GUAIACOL, a distillate of the creosote of beechwood, also known as Methyl Pyrocatechin. It contains about 75 per cent of creosote, for which it is much used as a substitute for the treatment of phthisis. Its chemical formula is $C_6H_4.OH.OCH_3$. It is partly soluble in water, and freely so in alcohol and oils. It is oily in appearance and resembles creosote in odor and taste. Its compounds are used also in the treatment of phthisis.

GUAIACUM, gwī'ạ'kum, a genus of trees of the family *Zygophyllaceæ*, natives of tropical America, remarkable for the hardness and heaviness of their wood, known as *lignum vitæ* or Brazil-wood; also the peculiar resinous product of the common species (*G. officinale*). This is a tree 30 or 40 feet high, usually growing with a crooked trunk and knotty branches. The wood and resin have been obtained chiefly from Cuba, Jamaica and Santo Domingo, but the tree is becoming scarce there. Guaiacum-wood is remarkable for the direction of its fibres, each layer of which crosses the preceding diagonally. It sinks in water. It is much valued and used for pulleys, casters, mortars, bowling balls and other purposes requiring an extremely firm and durable wood. It is pale yellow on the outside but blackish brown near the heart, where it abounds in resin. Stimulative and other medicinal properties reside in the bark, leaves and resin of this tree.

GUAIRA, La, lä gwä-ē'rä, Venezuela, a seaport on the Caribbean Sea, eight miles in a direct line (23 miles by rail) north of Caracas, of which it is the port. Moreover it is the chief port of the republic. It is situated on a narrow coast strip between high mountains and the sea, and has an unhealthful climate. There are modern harbor works including a breakwater, and a considerable export and import trade is carried on. The town dates from an ancient Spanish settlement in 1588. In 1903 the port was blockaded by British and German fleets to enforce a settlement of commercial claims. The British-built and owned La-Guaira-

Caracas railway accomplishes the climb over gradients of 1 in 27 to the head of the pass at 3,200 feet, whence it descends 200 feet to the city. The chief feature of the line is the small radius of the curves; and as the line climbs higher up into the gorge the train is sometimes only a few feet from the edge of precipices with a vertical drop of a thousand feet. There is (it has been said) only one dangerous part of the line, but that extends from La Guaira to Caracas. Pop. about 9,000; mean annual temperature 84.5° F.

GUAL, gwäl, **Pedro**, South American patriot: b. Caracas, 31 Jan. 1784; d. Guayaquil, Ecuador, 6 May 1862. He was graduated from the University of Caracas; joined the patriots in 1810, and was elected as a member of the legislature in 1811. In 1812, when the Republicans surrendered, he escaped to New York, but in a few years returned, was made governor of Cartagena, and later sent as Ambassador to the United States. He was admitted to the bar in Washington, and began the practice of law, but in 1816 joined Bolivar, was made governor of some of the conquered provinces, and was for a time Minister of Finance and Foreign Affairs. In 1858 he joined the revolt against Monagas, and was made president of the provisional government; in 1859 he was elected vice-president of Venezuela, and in 1860 became president, but resigned the next year, retiring to private life.

GUALEGUAY, gwä-lä-gwī′, Argentina, South America, city in the province of Entre Rios; also a navigable river, the least important of the triad of rivers that give the name (Entre Rios meaning «between rivers») to this province, noted for its output of cattle products. Consult ‘Argentine Year Book’ (Buenos Aires 1916).

GUALEGUAYCHÜ, gwä-lä-gwī-choo′, Argentina, South America, city in the province of Entre Rios, on the Gualeguaychú River, 12 miles from its confluence with the Uruguay. Its chief industries are connected with the raising and shipping of cattle and wheat, the preparation of beef extracts, etc. It has a library and a school and in 1917 had about 16,000 inhabitants.

GUAM, gwäm or goo-äm′, or **GUAJÁN**, gwä-hän′, one of the Ladrone Islands (otherwise known as the Mariana Archipelago), the southernmost and largest, and the only one with much population; east of the Philippines; occupied by the United States in 1898. It lies in lat. 13° 26′ N. and long. 144° 43′ E.; is 32 miles long by 4 to 10 wide, and about 210 square miles in area; high and precipitous on the eastern side, and forming a low plateau in the northern part, but mountainous in the south. About half the soil is arable, but only about 30,000 acres cultivated. Except for the native clearings, most of it is thick and pathless jungle. Some of the trees are valuable hardwoods for ship-building or ornamental cabinetwork; others are useful for food, as the coconut (the finest here of all the tropics), pineapple, breadfruit, sour-sop and custard-apple, etc.; the hau (*Hibiscus tilaceum*) makes strong cordage, not affected by water; the pandanus' long leaves are braided into mats and hats; and the ylang-ylang is famous for perfume. Rice, sugar, tobacco, hemp, coffee, cacao, bananas, melons, etc., have been introduced and are cultivated. The only native mammals are rats, flying foxes, and bats; but the deer and wild goat, of European origin, have thriven plentifully, and cows and pigs are raised. In 1915 there were about 6,000 head of cattle, including 900 water buffaloes. There are no snakes; there are centipedes and scorpions, but none dangerous. The climate is very rainy, but mild except in midsummer, when the conflict of trade-winds produces a dead calm, oppressive heat, and storms, with some hurricanes. As recently as 6 July 1918, the island was swept by a typhoon, which destroyed the crops and rendered half the inhabitants destitute and homeless. Earthquakes are frequent. The island is volcanic, with bordering coral reefs. The east side has but two good harbors, Pago and Tarofofo; the latter is the only one, except San Luis d'Apra on the west, which is safe for vessels all the year round. The total number of inhabitants (30 June 1915) was 13,689. The number of natives alone was given in 1913 as 12,448; the latter being Chamorros with a mixture of Tagal and Malay, and some Anglo-Saxons from whaling ships, producing half-breeds with copper skins and light hair. They are nearly all in the villages; those with ranches build rough huts on them, where the family spend part of the time. Agaña (San Ignacio de Agaña), the seat of government and the most important town, is a neat place with houses half of stone and half of wood or bamboo, and contains about 7,000 people. Its best port is Apra (above), on a deep bay formed by a peninsula; its own harbor being dangerous in a storm from the anchors dragging on the coral bottom, and the landing bad from breaking reefs. There is a mission school, endowed in the 17th century by Maria Ana, queen of Philip IV of Spain. The total number of pupils registered in all the schools was given in 1916 as 1,970. The governor of Guam (an officer of the navy of the United States) is the military commandant of the island and commandant of the naval station. As chief of the «Naval Government of the Island of Guam,» he combines executive with legislative powers. There is an Island Court for the trial of both civil and criminal cases and a Court of Appeals. Imports into the island amounted to $293,564 in the year ending 30 June 1915, and exports to $33,349. The official currency has been, since 1 July 1909, that of the United States.

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GUAN, gwän, a gallinaceous bird of the family *Cracidæ*, genus *Penelope*, characterized by the front of the throat being naked and wattled; specifically *P. cristata*. It is about 30 inches long, nearly half of which is due to the

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tail. The color is a shining reddish-green, with rump and belly chestnut, neck and chest white-spotted, and the feet and throat red; the female is of a more reddish tint, with the crest, neck and mantle bordered with white. Though the guans have most of the habits of the curassow (q.v.), they are far less gregarious, noisy and restless. They take to trees when alarmed, roost there at night and often make their nests among the branches. They inhabit the American tropics, one species, the chacalaca (*Ortalis vetula*), ranging into Texas. Guans have long been domesticated in South America.

GUANABACOA, gwä-nä-bä-kō'ä, Cuba, town well situated on high ground near the city of Havana. The number of its inhabitants shown by the United States War Department census of 1899 was 13,963 (that is, 8,232 native white; 1,091 foreign white; 2,173 negro; 2,408 mixed; and 61 Chinese). The total population is 10,500.

GUANAHANI, gwä-nä-ä-nē. See CAT ISLAND.

GUANAJAY, gwä-nä-hī', Cuba, town in the northeastern part of the province of Pinar del Rio, about 20 miles west of Havana. It is situated in a hill region of much salubrity, and is a popular health resort. Here is the terminus of the Havana and Guanajay Railroad. Pop. about 7,000.

GUANAJUATO, gwä-nä-hoo-ä'tō, Mexico, a state bounded by the states of San Luis Potosi, Queretaro, Michoacán and Jalisco. Area 11,370 square miles. The principal cordilleras traversing the state are the Sierra Gorda, in the northeast, and the Sierra de Guanajuato in the centre, which are formed by the junction of the Codorniches, San Antonio and Santa Rosa mountain ranges. In the south and west are the valleys of San Judas, San Felipe and Santiago, and the fertile plain of El Bajo. Rivers are the Lerma, with its affluents the Laja and the Turbio, the Irapuato and a number of smaller streams. There are many mineral springs, and one lake, 37 1-3 square miles in extent, called the lake of blood (Yuririapundaro). Five mining districts merit special mention; namely, the Sierra Gorda, Allende, Santa Cruz, Guanajuato and León, the principal mines being those which produce silver and gold, silver, mercury or cinnabar, tin, iron, lead or argentiferous lead, and copper or argentiferous copper. (See statistics given in connection with the city of Guanajuato). The climate, except in the higher parts of the mountain ranges, is not unfavorable (mean annual temperature about 70°). The rainy season extends from the middle of May until the beginning of July. During those months the rainfall is heavy in the valleys, but only moderate in the mountains. Pop. 1,085,681.

GUANAJUATO, Mexico, capital of the state of the same name. Elevation 6,200 feet above the sea. Distance from the city of Mexico 165 miles, and 1,000 miles by the Mexican Central Railway from the United States border at El Paso, Texas. It is situated in the heart of the Guanajuato mountains, in a picturesque ravine, six miles from the main line of the above named railway and overlooking a rich and beautiful region, and it is surrounded and honeycombed by mines hundreds of years old, which have produced unknown millions of precious metals and are still productive. Mining began here 500 years ago, devoloping, as it proceeded, some of the richest deposits ever discovered. Over $600,000,000 of gold and silver have been mined under and in the immediate vicinity of the city, fully two-thirds of which was gold. The buildings of the business centre are quite commodious and imposing and are very substantial, unlimited quantities of very superior building stone being immediately at hand. Among the prominent public buildings are the Government Palace, or State House, in which the legislature holds its sessions and the state officers have their offices, and the opera house or theatre, a magnificent stone structure copied from the Grand Opera House of Paris. In a remote part of the city are the famous Catacombs, wherein are stored the mummified remains of some 30 or 40 human beings representing both sexes, and several tons of human skulls and bones. At the opposite extremity of the city is the great dam of modern construction which contains the community's water supply. Another notable structure is the principal church of the city, built of the peculiar colored stone or marble which exists in great quantities in the immediate vicinity. It is surmounted by a dome of large proportions and exceptional beauty. There are several other churches, the ancient Mint, the State College, the Market de la Reforma and the Castle of Granaditis. There is a street railway, and a thorough system of electric lighting. The bank of Guanajuato and branches of the National bank and the bank of London and Mexico compose the financial institutions of the city. There are a State College and a Normal School for young women; two museums,— one connected with the State College and devoted to natural history and mineralogy, and the other devoted to «Antiquities, Minerals and Precious Objects.» Two public libraries contain over 13,000 volumes. In 1905 the city was flooded and much valuable property destroyed. Pop. 35,682.

GUANARE, gwä-nä'rā, Venezuela, city, capital of the State of Zamora, near the Guanarito River, about 220 miles southwest of Caracas. Coffee and sugar-cane are some of the chief agricultural productions; but the city is the centre of an extensive cattle trade. Pop. about 11,500.

GUANCHES, gwăn'chās, **GUANCHOS, GUANCHIS** (from *Guan*, a person, and *Chinet*, Teneriffe; or from Berber *acxes*, a son or young man), the inhabitants of the Canary Islands who are said to have called themselves Guanchinet, a term which the Spaniards corrupted into Guanches. The name seems to have been applied only to the inhabitants of Teneriffe; but it became the general designation in use by the Spaniards for the inhabitants of all the islands. The word Guanches is, therefore, used in two senses, the original inhabitants of the Canary Islands and the people living on them when they first attracted the attention of the civilized races of Europe and Africa. The language of the Canary Islands is one tongue divided into many dialects which contain a considerable admixture of foreign words. The people of the various islands composing the Canary group present quite different appearances. On some islands they are tall, fair-haired and handsome; on others they are darker and shorter and considerably different in features. On the various islands of the group there are different customs, habits, modes of living and development of arts and industries. Spanish reports show that on some islands custom permitted the women to have several husbands; on others polygamy was the rule; on still others monogamy. On some islands the inhabitants lived in caves, on others the priests, nobles and chiefs inhabited very substantial buildings of wood, stone or cement. Some tribes worshiped their chief gods on the mountain tops, others built stone shrines, while still others erected temples of stone or wood. All this would seem to indicate a mixture of races or the imposition of outside influence, or both. But the general mythological ideas of the inhabitants of all the islands seem to have been very similar. They all appear to have believed in a very powerful deity, variously designated the «sustainer of earth and sky,» the «preserver of the world,» the «preserver of men,» «the sustainer of life.» In different localities he had different names, which were often but translations of the same designation, as Abord, Alcorac, Alcoran, Acharnan, Eraoranam. To him and to the other Guanches deities there was dedicated an extensive and powerful priesthood whose influence seems to have been extended over all the affairs of the nation. In the Greater Canaries the priesthood seems to have been of as great or greater influence than the chief ruler; and there they alone had the power to confer the honors of knighthood or the rank of nobility. It is evident, therefore, that the high priest, at least, must have been chosen from the ranks of the nobles or of royalty. When the people of the main islands came into contact with people from the mainland of Europe and Africa this religious system had become highly organized; and it seems to have held in its grasp the political affairs of the people and to have possessed stone oratories and temples, though there is every reason to believe that the masses of the people were for the most part cave-dwellers, while the ruling class occupied dwellings of some pretentions. In other parts of the islands, however, the people all lived together in villages and possessed considerable community life. The variety of customs and modes of clothing were as noticeable in different islands as the other distinctions already mentioned. In some islands the natives went practically naked; on others they dressed in skins; while on others they appear to have understood the art of weaving and to have taken considerable pride in dressing themselves elaborately. In one respect. however, they were all more or less alike. They had numerous flocks and they grew different kinds of grain including barley and wheat. On some of the islands fruit was also cultivated, notably figs. The inhabitants of Canaries living along the coast were given to fishing; but they were not sailors and all their fishing exertions were confined to the shore.

The society of the Canary Islands seems to have run all the gamut from slavery to that of an entrenched nobility and priesthood and absolute rulers, back of whom was a very complicated mythology forming part of the governmental machinery of the classes. On some islands the chief ruler seems to have been absolute; on others the chiefs and nobles had a council which acted as a check on the power of the ruler; while on the more primitive of the islands the people were broken up into numerous petty tribes without any unity or any over-lord having command over more than his own tribe.

The origin of the Guanches has long been and is still a much disputed question. It is even uncertain whether the people found on the islands when they first came under the notice of the continental races were the descendants of the original races who have left traces of their life and long residence there. The evidence in hand, however, would seem to show that they were a very mixed race, long in possession of the islands and frequently acted and reacted upon by the maritime races of Europe and Africa. Some investigators have maintained that the original race of the Canaries was the Cro-Magnon, similar in every respect to the early inhabitants of southwestern Europe at the end of the Magdalenian epoch.

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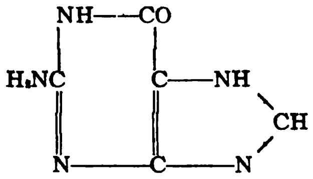
GUANES, gwä-näs', or **GUANE**, Cuba, town in the province of Pinar del Rio, about 10 miles from the sea and 120 miles southwest of Havana. The District Court holds its sessions here. The trade in the products of the surrounding country, lumber, tobacco and cattle, is extensive. Pop. about 1,400.

GUANIDIN, a basic organic substance, having the empiric formula CH_5N_3 and the constitutional formula $H.{:}C(NH_2)_2$. It may be prepared by heating an alcoholic solution of cyanamide and ammonium chloride to 212° F. Guanidin is a crystalline, deliquescent substance, with strongly alkaline properties, and it absorbs carbon dioxide from the air. It forms numerous salts, and urea is evolved in many of its reactions. In fact, it is this close relation with urea that gives guanidin its chief interest, many authorities holding the opinion that guanidin is an intermediate product in the formation of urea from proteid bodies, in the normal physiological chemistry of the body.

GUANIN, gwä'nĭn, $C_5H_5N_5O$, a yellowish-white, amorphous substance, which derives its name from being a constituent of guano; but it also forms the chief constituent of the excrement of spiders, has been found attached to the scales of fishes, and seems to be a normal constituent of the mammalian liver and pancreas. Its structural formula is



With regard to its occurrence in guano, as it has not been found in the recent excrement of sea-birds, there is every reason to believe that it is formed by slow oxidation (from atmospheric action) of uric acid, much as uric acid can be made to yield urea and oxalic acid. And in the pancreas and liver it probably represents one of those transitory stages of disintegrated nitrogenous tissue which are finally excreted by the kidneys in the more highly oxidized form of urea. Guanin is a base, but also forms salts with metals, and combines with salts. When heated with hydrochloric acid and potassium chlorate it is oxidized to carbon dioxide, guanidin and parabanic acid.

GUANO, gwä'nō (Spanish *guano huano,* from Peruvian *huanu,* dung), is the name for deposits of the partially decomposed and dry excrementitious matter of birds, especially sea-birds, as those that frequent coast islands. It is highly valued as a fertilizer. Deposits from sea-birds are found wherever there is good feeding-ground in the neighborhood of unfrequented islands and rocky cliffs. All the notable guano deposits exist in the hottest and driest parts of the tropics, as on the islands of the South Pacific Ocean. The most important of all were the deposits on the Chincha Islands off the coast of Peru, which for years yielded a considerable revenue, but were exhausted. The guano there was from 60 to 100 feet in thickness, and was entirely due to the droppings, accumulated for many ages, of the innumerable sea-birds which make these islands their resting-place and breeding-ground. The excrement rapidly dries by exposure to the sun in a region where the rainfall is slight, and thus the soluble salts of which guano to a great extent consists are retained. Peruvian guano is the best known, but in Patagonia, various points of Bolivia, Mexico, Chile, Malden Island and numerous other Pacific islands new deposits have been opened up as the older were exhausted.

Guano varies extremely in composition, even in the same deposit considerable differences will be found; and deposits from different localities show great difference in chemical content. Some consist mainly of phosphate of calcium and other fixed salts, while others contain much volatile matter, with a large proportion of ammonia. Peruvian guano is a very light, dry, non-cohesive, pale-yellow powder, with a characteristic ammoniacal odor, and sometimes contains lumps, made up of different salts. It is a very complex mixture, containing the urate of ammonium, the oxalates of ammonium and calcium, the phosphates of sodium, ammonium, calcium and magnesium, the sulphates of potassium, sodium and ammonium, the chlorides of sodium and ammonium, and the carbonate of calcium. There is always some moisture, organic matter of different kinds, sand from the rock on which the deposit lies, and this is an impediment to marketing. The ingredients which are especially prized are the ammoniacal salts, the phosphoric acid, in combination with the alkalies and alkaline earths, and the alkalies themselves, particularly the potash. It is the remarkable abundance of these constituents and their fine intermixture which caused Peruvian guano to be so much esteemed as a manure. The deposits often contained almost all the inorganic matter required by a plant, and that in a highly available form, so that it was one of the best of all fertilizing agents for different crops. As the supply became reduced, however, it was found to be very irregular in composition. Its use as a manure was known to the native Peruvians centuries ago, but no attention was paid to the accounts by modern travelers of its wonderful efficacy until A. von Humboldt took some to Europe, in 1804, and had it analyzed. It was not exported on a large scale till about 1850, and from that time the quantity sent to foreign countries, including large shipments to the United States, was very great, but the scientific study of fertilizers and utilization of local materials has much reduced the demand, and the supply is also much diminished.

As a substitute for ordinary guano, what is known as fish-guano has been in use for a considerable number of years. This consists essentially of fish and fish offal dried and powdered. In the case of oily fish, such as herrings, it is customary to extract as much of the oil as possible before the operation of powdering; and it will thus be understood that different kinds of fish differ greatly as regards their value for manurial purposes. But all sorts of fish-guano contain a large percentage of ammonia and phosphate of lime, and are thus valuable as fertilizers (q.v.). Consult Coker, 'Fisheries and Guano Industry of Peru' (in Bureau of Fisheries Bull. 8, Pt. 1, 1908).

GUANTA, gwän-tä', Venezuela, a modern seaport on the north coast, in the state of Bermudez, 12 miles west of Barcelona by rail.

GUANTÁNAMO, gwän-tänä-mō, Cuba, town in the province of Oriente, situated near the head of the most important harbor east of the city of Santiago on the southern coast. Its surroundings were favorably known before 1898, for the beauty of the groves of lime-trees and lemon-trees, the coffee plantations and the residences of wealthy planters, who made the heights overlooking the bay a favorite place of resort. Since the Spanish-American War, Guantánamo Bay has been famous as the scene of certain military operations. On 19 May 1898 an unsuccessful attempt to cut the cable in the bay was made by the *Saint Louis* and the *Wompatuck.* On 10 June a force of 600 marines landed from the transport *Panther* on the eastern shore of Guantánamo Bay and undertook to make the outer harbor a secure place for the use of American vessels when coaling or as a rendezvous and a refuge in stormy weather. The marines established their camp («Camp McCalla») on a small hill, where they sustained the attacks of the Spanish troops for several days; and the courage and endurance displayed at this time must be regarded as memorable features of the war The *Marble-*

head and *Texas* lent assistance, the latter on 12 June sending 40 marines with two automatic guns. In the course of that week the camp was protected by earthworks; other warships arrived and shelled the thickets in which the Spaniards were concealed, the forts and the town; the garrison was strengthened by accessions of bluejackets and Cuban insurgents familiar with the country; and thus, when ten days had passed, the outer harbor was practically in the possession of the American forces. In July 1901 the American government chose a site on this bay for one of the naval stations in Cuba. In 1903 land on both sides of the entrance was leased from the Cuban government, and the chief naval base of the United States in the West Indies was developed there (1904–16). The number of inhabitants of the town of Guantánamo, according to the United States War Department census of 1899, was 7,137. The total population of the district in 1914 was given as 51,036.

GUAPORÉ, gwä-pō-rā′, or **ITENEZ**, a South American river which rises in the Sierra Aguapehi, in the state of Matto Grosso, Brazil, flows south, nearly parallel to the Jauru, passes the town of Matto Grosso, whence it is navigable downward for light draught vessels, then with a northwesterly trend forms part of the boundary between Brazil and Bolivia, and finally after a course of over 960 miles, unites with the Mamoré to form the Madeira.

GUARANA, gwä-rä′nä, a dried paste consisting chiefly of the crushed or pounded seeds of *Paullinia sorbilis*, a climbing shrub, native of South America. The seeds are obtained largely from the cultivated plants, and in South America guarana is used much as tea or coffee is used in other countries. It is the staple drink of millions of people. Guarana is found in the drug market in the form of flattened cakes or cylinders of a dark reddish-brown color and showing on fracture numerous coarse angular fragments of seeds. The taste is astringent and somewhat bitter, becoming sweet on chewing. Guarana contains 4 to 5 per cent of caffeine, making it twice as strong as coffee. Its action, however, resembles more closely that of tea because of the high percentage of tannic acid it contains. In medicine it has been used in the treatment of sick-headache.

GUARANA-BREAD, the seeds of the *Paullinia sorbilis* (a South American tree), pounded, made into cakes and dried in the sun. It is extensively used in Brazil and other parts of South America as a stimulant and restorative, and as a material for making a refreshing beverage. The active principle of guaranine is said to be identical with theine or caffeine (q.v.); and no known substance yields it so abundantly. Other species of *Paullinia* possess poisonous properties.

GUARANIES, gwä′ra-nēz, a numerous family of Indians inhabiting the greater part of the Rio de la Plata region, Paraguay, and a very considerable region in Brazil. They reach westward to the foothills of the Andes. The Guaranies are divided into small tribal bands each of which has its own tribal leader. In addition to this vast extension of tribes of the same great family ethnologists are inclined to the view that numerous tribes of Argentina are also of the same origin as the Guaranies. At the time of the conquest the Guaranies were very much less civilized than the tribes by which they were surrounded. They lived by hunting and on wild fruits, roots and vegetables, and went practically naked. Their customs were apparently very simple; but they were great lovers of their homes which they defended stubbornly and bravely against the Spanish and Portuguese invaders. They seem to have lived in villages and to have been of a very social nature. The Jesuit missionaries visited them and succeeded in gaining a strong influence over many of their villages, among which they introduced European arts and industries, which very considerably improved their social condition. Long wars and epidemic diseases have reduced to a comparatively small population this once numerous family of Indians. However the mixed race that sprang from the Guaranies and the Spaniards is of considerable extent and of importance in the industrial life of Brazil. A mestizo race, a cross between negroes and Guaranies is also found to-day in parts of Bolivia, in Panama, in Argentina, in the State of Rio Grande do Sul (Brazil) and in Paraguay. For the most part this large mestizo population speak the native Indian tongue. Owing to the work of the missionaries, the language of the Guaranies is one of the best known of the native tongues of South America. Guarani is considerably mixed with Spanish or Portuguese words, or both, and, in this form, is the speech of a great part of the rural districts of Paraguay.

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GUARANTY, or **GUARANTEE**, a contract or undertaking by which one agrees to answer legally for the default of another. One who undertakes such a contract is called a guarantor. In Great Britain and in some jurisdictions of the United States, the word «guarantor» is used with a broader signification than in other jurisdictions, generally being nearly or quite equivalent to the word «surety.» Usually a guaranty relates to the payment of money or its collectibility or the genuineness of an obligation, and is a collateral undertaking. Guaranty has been treated as a branch of suretyship. Ordinarily the contract of a guarantor is distinguished from that of a surety, in that the former is a distinct from that of his principal, whereas the contract of a surety is made jointly and at the same time as his principal. Furthermore, it has been held that the guarantor becomes liable only by the happening of a contingency after the contract is made, whereas the surety is liable from the time of the signing of such contract. The guarantor, according to some authorities, agrees only to pay on notice if his principal cannot, whereas a surety agrees to pay if his principal does not. On the other hand, some authorities hold that the difference between the contract of a guarantor and the contract of a surety is shadowy, and what is called by some courts a contract of guaranty is called by others a contract of suretyship.

Guaranty, although like warranty a collateral undertaking, must not be confused with that term, a warranty being merely an undertaking that a certain fact is as represented. Ordinarily contracts both of guaranty and suretyship must be evidenced by a written memorandum to comply with the provisions of the statute of frauds, both being undertakings to answer for the default of another. A contract of guaranty, to be valid, must be for a sufficient legal consideration. Failure of consideration is a good defense by the guarantor. Fraud practised on the guarantor by the principal is no defense to a contract of this nature unless the creditor has participated therein. The same rules of construction apply to contracts of guaranty as to other contracts, the apparent intention of the parties, as gathered from the contract, being the controlling factor. Usually the default of the principal alone does not fix the liability of the guarantor, but the creditor must use reasonable efforts to collect the debt of the principal, and upon failure to do so must give the guarantor due notice. See CONTRACT; SURETY; WARRANTY.

EDWARD F. DONOVAN.

GUARANTY INSURANCE. The so-called casualty or miscellaneous lines of insurance cover a variety of guaranty business, such as guaranteeing the fidelity of persons in places of trust, guaranteeing surety bonds and undertakings required in actions or proceedings, guaranteeing the legality of public bond issues and guaranteeing merchants in giving credit. The term guaranty insurance is specifically applicable, however, to the business of about 50 corporations separately organized at the present time in the United States, with an aggregate capital of over $30,000,000, net surplus of over $35,000,000 and a yearly income of over $15,000,000, according to the latest reports, devoted to the guaranteeing of real estate titles and of bonds and mortgages on real estate. This line of insurance has been particularly useful where a subdivision of large tracts of land has taken place in the West and latterly in the real estate developments that have occurred in or adjoining large cities. Title and mortgage guaranty insurances have also become an essential element to investment in real estate, especially where trust funds are concerned, as all uncertainty as to these securities is thereby eliminated without the delay and expense incident to repeated searches. The business of this class of companies is almost entirely local to their domiciles and involves an extensive accumulation of real estate records. The purchase and sale of real estate and of mortgages is carried on incidentally or in connection with associated companies.

GUARAUNO, gwȧ-rou'nō, tribe of Indians of South America who inhabit the delta of the Orinoco, Venezuela.

GUARD, National. See MILITIA.

GUARDAFUI CAPE. See CAPE GUARDAFUI.

GUARDI, gwär'dē, **Francesco,** Italian painter: b. Venice, 1712; d. there, 1793. He was a pupil and follower of Canaletto; his work shows less exactness in detail than his master's, but is superior in use of color. His paintings are mostly of scenes in Venice; they include 'Procession of the Doge'; 'Fete of Corpus Domini'; 'Grand Hall of the Palazzo Ducale' (in the Louvre, Paris); 'Church and Piazza of San Marco' (National Gallery, London); and 'The Rialto' (Metropolitan Museum, New York).

GUARDIA, gwär'dyą, **Tomás,** Costa Rican president: b. Bagaces, Guanacaste, 1832; d. 1882. Entering the army, he saw service against the Walker filibuster (1855) and became colonel. From 1866–69 he was governor of Alajuela. A successful revolt against Jiminez brought about the installation of Carranza as temporary president and raised Guardia to the command of the army (1870). In the same year Guardia succeeded to the presidency, an office which he held until his death.

GUARDIAGRELE, gwär-de-ȧ-grā'lā, Italy, city in Chieti province, not far from the Adriatic and 18 miles from Ortona, with which it is connected by rail. The agricultural products of the neighborhood include grain and olives. Iron and magnesia are also found in the mineral springs nearby. Pop. of the commune, about 10,000.

GUARDIAN, in law, one having legal charge of the person or property or both of another who is incompetent to act for himself, as an insane person or an infant. The term more usually is applied to one who has legal charge of the affairs of another who is less than 21 years of age. The most usual classes of guardians to-day are those appointed by the courts or by the parents, including testamentary guardians and judicial guardians. Among the latter class are guardians *ad litem,* who are appointed by the courts to defend a particular suit brought against an infant. Both in England and the United States a father has the right to appoint a guardian in his will for his minor children, and such guardianship continues until the ward reaches the age of 21 years. The courts of equity have jurisdiction over such guardians, and they may be required to account at intervals to show that they are properly administering the property of their wards.

By statutes in England, particularly those of 1886, 1891 and 1908, some sweeping changes have been made in the law of guardians. The statute of 1886, for instance, abrogated the old rule that the father had the sole right to the control of the custody and tuition of his children until they were 21 years of age, and gave the mother almost equal powers, among others the right to appoint a guardian to act after her death. Such guardian can act even if the father survives the mother provided it be proved that he is not fitted to be sole guardian. Other changes were made also, such as awarding custody of the children to the innocent party in a divorce suit at the discretion of the court, custody of the children in case of abandonment by one of the parents, etc.

In England, guardians not appointed by a court cannot be removed by judicial process, but such is not usually the case in most states in this country.

GUARDIAN ANGEL, an angel who watches over a particular individual. It is the general belief, in the Roman Catholic and Greek churches that every man has a guardian angel who defends him from evil, suggests good thoughts and wise counsels, and helps him in prayer. This belief is based on the words of Christ in Matt. xviii, 10: «Their angels do always behold the face of my Father which is in heaven»; the fathers of the church strongly inculcate it, and in the lives of the saints instances are given of the active interference of guardian angels. The belief is shared by some Anglican high churchmen. The Roman Catholic Church celebrates the Feast of Guardian Angels on 2 October. See also Guardian Spirit.

GUARDIAN SPIRIT, a spirit that watches over the welfare of an individual, a household or a community. The belief in such a being finds expression in some form in all primitive religions, and in many which have reached a higher stage of development. The Australian aborigine believes that when a warrior kills his first foe the spirit of the slain enters the body of the slayer and becomes his guardian; in Tasmania a native has been heard to ascribe his deliverance from danger to the watchful care of his deceased father's spirit; and the most important religious rite of a North American Indian is to enlist the services of a patron genius. The same belief in guardian spirits obtains in Africa, Asia and among the Indians of South America, as it did formerly among the Aryans of Northern Europe. Greeks and Romans believed that each individual was under the special protection of a spirit who prompted him to good deeds, warned him against danger and guided him through life. Gradually there also arose a belief in an evil spirit who was at constant war with the good spirit and instigated every evil deed. These spirits were called *dæmons* in Greece and *genii* in Rome. The Romans also believed that the spirit of the founder of each family was the guardian spirit (the Lar) of the family and worshipped the *lares* with special rites. The ancestor worship among the Chinese and Japanese seems to have had a similar origin. The *penates,* on the other hand, were the household gods. For the Christian form of the belief see Guardian Angel.

GUARDS. A guard, in the primary sense, is one who watches or protects a person or persons, a place, property, etc., against loss, danger, or harm; as a body-guard, a prison-guard, etc. Body-guards have been an inseparable accompaniment of monarchy from the earliest ages; the Assyrian and Persian kings employed them, and the corps of «Argyraspides,» or silver-shields were selected by Alexander out of the bravest men of his army. The Roman emperors had their Prætorian guard. Napoleon I, first created a small troop of body-guards, with the title of Guides, while he was yet only general, in his first Italian campaign. From this arose by degrees, the great institution of the Imperial Guard, consolidated in 1804, which 10 years later comprised 102,708 men, and after being disbanded by Louis XVIII, in 1815, was restored by Napoleon III, in 1854. It consists of infantry, cavalry and artillery. In England, the guards, otherwise called household troops, consist of two regiments of Life Guards, the royal regiment of Horse Guards, and five regiments of Foot Guards: the Coldstream, Scots, Grenadier, Welsh and Irish. Many of the European sovereigns before the French Revolution had small corps of foreign troops which served in this capacity. Thus the French had, in former times, the Guard of Scottish Archers, and at a later period, a body of Swiss guards, called the Cent Suisses. The Cent-Gardes formed by Napoleon III, are founded upon the latter. The Pope no longer retains his Swiss guards. In Prussia there is both infantry and cavalry of the guard, and the Russian Imperial Guard forms an entire corps d'armée 50,000 strong.

In general military use the term guard is of various distinct applications and denotes functions of great importance. It means a sentry on duty, and also a body of soldiers assigned, under the proper officer or officers, to the duty of guarding or protecting a camp, post or any place where military control is established. Company and regimental details for guard duty are made according to circumstances — the number of men required or available, etc.,— rank of officers being also regarded as far as convenient. Guard-mounting or inspection and review before the old guard is relieved, is a ceremony of much detail and is usually carried out with strict military observance.

GUARINI, gwä-rē'nē, **Camillo-Guarino,** Italian monk, author and architect: b. Modena, 1624; d. Milan, 1683. Besides being an excellent mathematician and architect, Guarini was also learned in literature and philosophy, which he taught at Messina. In 1641 he became architect to the Duke of Savoy, and under his patronage executed the plans for numerous buildings. Examples of his work are at Modena, Vienna, Prague, Lisbon, Verona and Paris. Among these may be mentioned the palace of the Duke of Savoy; the church of Saint Philip Neri; of Maria d'Etling (Prague) and Santa Marie della Providenza, Lisbon. He wrote ‘Disegni d'architettura civile ed ecclesiastica’ (1668); and ‘Leges temporum et planetarum’ (1678). Consult Milizia, ‘Lives of Celebrated Architects, Ancient and Modern’ (trans. by Cresy, 2 vols., London 1826).

GUARINI, Giovanni Battista, Italian poet: b. Ferrara, 10 Dec. 1537; d. Venice, 1612. He studied in the universities of Pisa, Padua and Ferrara and was appointed to the chair of literature in the latter, and soon published some sonnets which obtained great popularity. At the age of 30, he accepted service at the court of Ferrara and was intrusted by Duke Alfonso II with various diplomatic missions. He withdrew from the court about 1587. Having resided successively in Savoy, Mantua, Florence and Urbino, he returned to his native Ferrara. An irascible sensitiveness, joined to an exaggerated estimate of his personal dignity, neutralized many qualities both brilliant and solid, which seemed to fit Guarini exactly for a court career. To these defects, in part, may be attributed the frequent mortifications which tracked him through life. As a poet, he is remarkable for refined grace of language and sweetness of sentiment, while his defects are occasional artificiality, a too constant recurrence of antithetical imagery, and an affected dallying with his ideas. His chief work, ‘Il Pastor Fido,’ is regarded in Italy as a standard of elegant pastoral composition. The writer designed it as a tragio-comic pastoral, its first dramatic representation was in honor of the nuptials of the Duke of Savoy and Catherine of Austria in 1585. It ran through 40 editions during Guarini's life and was translated into most modern languages. Its superb and perfect diction is flooded with sensuousness. Cardinal Bellarmine told Guarini that he had done more harm to Christianity by his blandishments in poetry than Luther by his heresies in theology. Tasso and Guarini have been frequently compared; the two poets were literary friends and reciprocal admirers, though rivals in love. Guarini's varied writings, including sonnets, comedies, satires and political treatises, were published at Ferrara (4 vols., 1737). Consult Everett, W., ‘Italian Poets since Dante’ (New York 1904); Rossi, V., ‘B. Guarini e Il pastor fido’ (Turin 1886); Sanctis, F. de, ‘Storia della letteratura italiana’ (Vol. II, Naples 1903); Saviotti, A., ‘Guariniana, ecc.’ (Pesaro 1888); Shelley, M. W., ‘Lives of the Most Eminent Literary and Scientific Men of Italy’ (Vol. II, London 1835). See Il Pastor Fido.

GUARINO DA VERONA, Italian classicist: b. Verona, 1370; d. Ferrara, 1460. He was educated at Constantinople, where he came under the influence of Chrysoloras who taught him Greek. Returning to Italy with some Greek manuscript he had collected, he taught at Verona, Venice and Florence, and later at Ferrara. He also acted as interpreter at the Council of Ferrara. His chief contributions to classical study are his translations of Strabo some of Plutarch's ‘Lives,’ commentaries on Aristotle, Cicero, Persius, Juvenal and Martial and a Greek grammar based on the work of Chrysoloras. Consult Sandys, ‘A History of Classical Scholarship’ (Vol. II, Cambridge 1908).

GUARNERI, gwär-nā'rē, or **GUARNERIUS**, a family of Cremona renowned for the manufacture of violins. The best-known members of the family were: (1) Andreas, b. 1630; d. 1698, who learned the trade with Stradivarius from Nicolò Amati; (2) Giusseppe, b. 1666; d. 1739, his son who succeeded his father, but modelled his violins after Stradivarius; (3) Pietro, b. 1695, son of Giuseppe; (4) Pietro Giovanni, b. 1655, son of Andreas, settled at Mantua, where he manufactured instruments varying from those of his father in several particulars; (5) Giuseppe Antonio, the most renowned of all, b. 1687; d. about 1745. He was called «del Gesù» from the inscription I. H. S. on his labels. He copied Gaspar di Salo in the style of construction, making his instruments heavier and richer in tone than those of Stradivarius. See Violin. Consult Petherick, H., ‘Joseph Guarnerius, his Work and his Master’ (London 1906).

GUASA, gwā'sä, or **WARSAW**, a name given in the Gulf of Mexico and West Indian region to various large groupers (sea bass), especially the jewfish (q.v.). «Warsaw» is an anglicized form of the Spanish word. See Groupers.

GUASCO, gwäs'kō, **Alexandre**, French jurist and author: b. Bastia, Corsica, 7 Dec. 1853. He has for many years been engaged in the practice of law at Bastia and Paris. He is secretary of the Society for the Propagation of the Faith, is knight of the Order of Saint Sylvester, of the Holy Sepulchre, and of the Order of Saint Gregory. His works include ‘Condition des etrangers’; ‘Les origines et l'histoire de l'Oeuvre de la Propagation de la Foi.’ He collaborated in Piolet ‘Missions catholiques,’ to which he contributed ‘Les Etats-Unis,’ ‘Haiti,’ ‘Guyane française,’ ‘L'Amerique et ses habitants,’ ‘Les anciennes missions daus l' Amérique du Sud.’ He is a contributor to ‘The Catholic Encyclopedia,’ *La Revue de la Révolution, Revue des questions diplomatiques et colonials, Revue générale de droit international public.*

GUASTALLA, gwä-stäl'la, Italy, a city in the province of Reggio, 18 miles north of the city of that name on the Po River. There are railroad connections with Parma and Mantua. The points of interest are the old fortifications dating from the 16th century and the cathedral from the 10th. The Lombards founded the city in the 7th century. It was the scene of a council called by Paschal II, (1106). After changing hands several times, it became a possession of the Gonzaga family (1539), and was made a duchy in 1621. In 1748 it was given to the Duke of Parma, and in 1796 became a part of the Casalpine Republic. In 1847 it was annexed to Modena. Guastala is the seat of a bishopric. The chief industries are the manufacture of cheese and wine and the principal buildings are the school of music, municipal theatre, public library, gymnasium and the statue of Ferdinand I, by Leoni. Pop. town 2,700; commune 11,900.

GUATEMALA, a republic in Central America, bounded on the north by Mexico, British Honduras and the Bay of Honduras, on the east and southeast by the Gulf of Amatique, Honduras and Salvador; on the south and southwest by the Pacific Ocean; and on the west by Mexico. Its area is estimated at 48,290 square miles; its territory extending from lat. 13° 42' to 17° 49' N., and from long. 88° 10' to 92° 30' W.

The mountains of Guatemala are commonly referred to as «Cordillera of the Andes,» «Guatemalan Andes,» or simply «Andes,» though there is no propriety in those names. The Andes terminate in northern Colombia, and have no genetic connection with the mountains of Central America. The latter (so far as the great continental ranges are concerned), are also in their geologic history totally distinct from the Rocky Mountain system, or North American Cordilleras, which terminate in southern Mexico. If the trends of the Andean and Rocky Mountain systems were protracted from their termini (in 70° W. and 97° W., respectively), they would not connect with each other, but would pass the latitude of Guatemala in parallel lines nearly 2,000 miles apart. The Guatemalan mountains belong to the Antillean system, which lies between the termini just referred to. Its ranges, composed of folded sedimentaries, in eastern Guatemala have an east-and-west trend. But the ranges near the Pacific coast of the republic, crossing the western ends of the Antillean corrugations diagonally, or with a northwest-and-southeast trend, form a part of the volcanic chain which extends along the entire western coast of Central America, and is continued in Mexico. The Sierra Madre is the principal range of the west and south. In the central and eastern districts are the Sierra de Chama, Sierra de las Minas, Sierra de Santa Cruz and the Sierra de Copán, the last named on the frontier of Honduras. The highest points of the Cordillera are given as: Tajumulco (12,600 feet), Tacaná (12,400 feet), both in the southwest; Acatenango (11,100 feet), south-central; and the Volcan de Fuego (11,400 feet), also south-central.

Among the Guatemalan rivers emptying into the Gulf of Mexico are: the Usumacinta, on the Mexican frontier, and the Cuilco and Salequa, which are also tributaries of Mexican streams. The following empty either into the Gulf of Honduras or Izabal Lake (Golfo Dulce): the Montagua, Rio Hondo, the Dulce, the Belice, the Sarstoon and the Polochic. Those which flow into the Pacific are: Rio de los Esclavos, Rio de Paz, the Michatoya, Guacalate, Coyelate, Patulul, Nagualate, Samalá, Tilapa, Naranjo and Suchiate. Steamship navigation has been established on the Dulce and Polochic rivers; seven or eight of the others are navigable for small boats. The most important lakes are: Atitlán and Izabal (both navigated by steamers), Petén, Amatitlán, Ayarza and Güija (on the frontier of Salvador). Ports on the Caribbean side of the republic are: Puerto Barrios, Livingston and Santo Tomás, the first two being ports of entry and delivery, while the last is a «minor port,» at which importation and exportation are restricted to certain articles. On the Pacific coast the most important ports are: San José, 74½ miles from Guatemala City; Champerico and Ocós — all ports of entry and delivery, provided with iron piers, etc.

The lowlands of the Pacific and Atlantic coasts are torrid; interior table-lands, at an altitude of 2,000 to 5,000 feet, have an agreeable climate; and the high districts, where the elevation is more than 5,000 feet, are decidedly cool. The larger towns are built in the temperate or cool zones. The rainy season, beginning in May, lasts until October in the interior, but sometimes until December, on the coast. December and January are the coldest months; March and April the hottest. Snow sometimes falls (in December or January) on the uplands of the cool zone.

The rich soil and varying climatic conditions favor a wide range of products in the vegetable kingdom; no systematic classification of these, however, has yet been made. The extent of the forest land, which abounds in mahogany, is estimated at 1,300,000 acres. The fauna and avifauna resemble those of Costa Rica in general. Deer are quite numerous. Tapir, honey-bear, armadillo, wild pig, cougar and jaguar, are found throughout Central America. The overabundance of insect life is particularly noteworthy.

Gold and silver are found near Montagua River and elsewhere; salt in the departments of Alta Verapaz and Santa Rosa. Other minerals are: coal, lignite, manganese, lead, tin, cinnabar, copper, kaolin, opals, slate, alum, antimony, marble, alabaster, sulphur, ochre, asbestos, plumbago, chalk and bitumen. A belt of country extending from the coast range of mountains on the western frontier, near the Pacific, across the Sierra Madre to the coast range of the Caribbean slope, is essentially a mineral territory, in which there has been comparatively little systematic exploiting or prospecting.

History.— Pedro de Alvarado, one of the lieutenants of Cortés, 1523–24 conquered the country, and on 25 July 1524 proclaimed the sovereignty of Spain at Almolonga, the native town which was afterward to be known as Santiago de los Caballeros. After the conquest all of the territory now divided among the Central American countries was included in the Captain-generalcy of Guatemala. Independence of Spanish rule was proclaimed 15 Sept. 1821. Annexation to the Mexican empire under Iturbide followed (5 Jan. 1822). An assembly of representative citizens of Guatemala and the other Central American provinces on 1 July 1823 declared the whole country to be independent, with reference to Mexico, Spain and all other nations, «whether of the Old or of the New World.» Accordingly the United Provinces of Central America came into existence. Guatemala seceded from this union 17 April 1839. The name República de Guatemala was assumed 21 March 1847. Between 1839 and 1851 there was a series of bitter struggles with Salvador for supremacy, fortune favoring the smaller republic. But in the year last mentioned Guatemala began to be successful, and, under the leadership of Rafael Carrera (president until 1856, and subsequently life-president or dictator), carried the war into Salvador (1863) and regained the controlling position in Central America. Carrera appointed his own successor and died in 1865. The next significant administration was that of Gen. Justo Rufino Barrios, who was put into office by the Liberals, after their onslaught upon the Jesuits. Barillas was elected to the presidency in 1886. In 1890 and 1891 the progress of the country was checked by epidemics of cholera and smallpox. On 15 March 1892 José Maria Reina Barrios was inaugurated as president, and by a decree of the National Assembly (30 Aug. 1897) his term was extended to 15 March 1902, in direct violation of the constitution, which was proclaimed in 1879 and modified in 1885, 1887 and 1889. He was assassinated 8 Feb. 1898. Señor Manuel Estrada Cabrera was proclaimed acting president, and received the support of the army. An insurrection begun under General Castillo's leadership 28 July was put down, but only to be quickly followed by another revolutionary movement. Insurgent forces commanded by Morales offered a stubborn resistance in the southwest, until Morales was captured. When peace had been restored, Cabrera was the only candidate for the presidency, and his election was announced 25 Sept. 1898. In the following year the government of Guatemala made a proposition which was equivalent to repudiation of a part of its foreign debt, but yielded to Germany's protest, or threat, to use force and withdrew the suggestion. Earthquakes which occurred in April 1902 caused great damage in several districts. Amatitlan, Mazatenango, San Marcos, Sololá and San Felipe suffered severely, and Quezaltenango, in importance the second city of the republic, was totally destroyed. An eruption of the volcano Santa María followed on 24 October, and there were outbursts from new craters in November. Several thousand persons lost their lives through these disasters, and the injury to property (plantations, buildings, machinery and cattle) has been estimated at $5,000,000 to $10,000,000. A convention between the United States and Guatemala relating to the tenure and disposition of real and personal property was signed 27 Aug. 1901; and ratifications exchanged at Guatemala 16 Sept. 1902. A revolt in 1906, under the leadership of General Barillas, spread to the other Central American countries. The governments of the United States and Mexico interposed. An armistice (19 July) served not only to restore order for the time being, but also paved the way for the Central American Peace Conference held at Washington in 1907. In 1910 Cabrera's third complete term as President began. In 1913 Great Britain sent a warship to Guatemala and demanded settlement of claims. The country without a navy appealed to the United States, and an agreement was made in regard to the debt. In 1915 a boundary treaty was signed with Honduras. In 1917 Cabrera was re-elected President for the ensuing six years. Guatemala was the first of the Central American nations to sever diplomatic relations with Germany in connection with the European War and to place the ports and railways of the country at the disposition of the United States for the common defense. Guatemala city was destroyed by earthquake in December 1917.

Government and Education.— The legislative power is vested in the National Assembly (a single house), whose members (deputies) number one for every 20,000 inhabitants, and are elected for four years by popular vote. The executive power is vested in a president, elected for six years by direct vote of the people. The administration is carried on under the president, by «six secretaries of state,» each of whom has charge of a separate department (*ministerio*). These departments are: Government and Justice, Foreign Relations, Public Instruction, Promotion of Public Welfare (*Fomento*), Treasury and Public Credit and War. The council of state is an advisory board, of which five members are chosen by the assembly and four, in addition to the Cabinet, appointed by the President.

The «Political head» (*Jefe Politico*) of each department of the republic is appointed by the president, whose authority he exercises in provincial matters. The local officials locally elected are: the *Alcaldes* (one or more for each municipal district) and the *Regidores* or members of the municipal council (*Alcalde* and *Regidor* correspond respectively to mayor and alderman).

The Supreme Court of justice consists of a chief justice and four associates, elected by the people. There are six courts of appeal, each consisting of a chief justice and two associates, also elected by the people. Courts of the first instance are 29 in number. Their judges are selected by the president among the candidates approved by the chief justice of the Supreme Court.

Public instruction, supported by the government, is secular and gratuitous; primary instruction is obligatory; free education is guaranteed by the constitution. The chief institutions for secondary education in Guatemala are the Central National Institute for Boys, with an enrollment in 1913 of 553 pupils; the Central National Institute for Girls, with 385 pupils; the National Institute and Normal School Annex for Boys, at Chiqumula, with 274 pupils; and a similar school for girls in the same city, with an enrollment of 80 pupils; the National Institute for Boys and Practical and Commercial School Annex at Quezaltenango, with 40 pupils. The national library contains 30,000 volumes and many valuable unpublished documents. Other libraries accessible to the public are those of the professional schools, the Supreme Court, national institute for men and academy of teachers. Public libraries are maintained in the larger towns. The national printing office at the capital is regarded as one of the best establishments of its kind in Latin America. More than 30 daily papers and other periodicals are published in the country. The constitution guarantees liberty of conscience. The government recognizes no creed. The prevailing religion is Roman Catholicism.

Agriculture, Commerce and Industries.— Coffee grows in the regions between 1,000 and 6,000 feet above the sea-level. The districts best suited for growing coffee are Antigua, Barberena, Costa Chuvá, Alta Verapaz, Costa Cuca, Costa Grande, Pochuta and Tumbador. The total production for the 1916–17 season was 80,000,000 pounds valued at from $10,000,000 to $12,000,000 gold. The average yield per acre was approximately 800 to 830 pounds, the total area under coffee cultivation being 98,800 acres. Germans own and control between 50 and 60 per cent of the coffee plantations; only a very small proportion represents American investments. In 1915 the United States took 66 per cent of the crop, and between 75 and 80 per cent the year following, the remainder going to the Scandinavian countries. Sugar cane grows between sea-level and 5,000 feet. In 1915, 30,000,000 pounds of sugar were produced, an increase of 20 per cent over the crop of 1914. The bulk of this production was exported to the United States and British Columbia. Cacao grows in the lowlands or those regions having an altitude of less than 3,000 feet. Tobacco and wheat are also produced in large quantities. Corn or maize and beans or frijoles form almost exclusively the daily food of nearly three-fourths of the people of Guatemala. The production of corn is sufficient for local consumption, amounting to 600,000,000 pounds, a yield of 1,300 to 1,800 pounds per acre annually. Of beans the annual production is about 180,000,000 pounds. Stock-raising has been encouraged in the departments of Izabal, Zacapa, Petén and Alta Verapaz, by decrees authorizing the political chiefs of those departments to make grants of land to persons who establish ranches. Money premiums have been offered to cultivators of india rubber, cacao, sarsaparilla and hemp; grants of land to those who engage in the cultivation of wheat and bananas. Proprietors of large cotton or tobacco plantations, and reliable day laborers on large plantations of coffee, sugar cane, bananas or cacao, are exempted from military service. No tax of any kind is levied for 10 years upon plantations of hemp, flax, ramié, cotton, grapes and several other products. The chicle industry is growing fast, particularly in Peten. In 1915, 7,238 quintals, valued at $231,624, were exported.

In 1916, the total imports of Guatemala amounted to $6,725,601, and the total exports to $10,618,176, making the total foreign trade equal to $17,343,777. During the year ending July 1917, the United States exported goods to the amount of $5,228,325, and imported $8,668,573; the United Kingdom imported $86,087, and exported $1,056,795; France exported $149,515; Spain, $75,365; and other countries, $215,601. The Netherlands imported $947,042; Sweden, $245,183; Honduras, $97,619; Germany, $91,658, and other countries, $482,014. The value of the coffee exported is about 80 per cent of the total value of the country's exports. During 1915, Guatemala manufactured 11,893,456 bottles of aguardiente, or brandy, valued approximately at $1,200,000 United States gold, and imported wines, liquors and beer to the value of $125,583 United States gold.

The great increase of trade with the United States is due largely to the European War. Coffee constituted the chief article of shipment, the value being $6,301,337, followed by bananas, valued at $1,035,427, and hides, over $500,000. Of the imports the share of the United States was $5,228,897, or 77.74 per cent of the total. The chief imports from the United States were cotton goods valued at $952,086, flour amounting to $612,809. The United States supplied also 93 per cent of the manufactures of iron, copper, tin and lead and their compounds; 95 per cent of the industrial and agricultural machinery, and all of the railway material.

For the partial supply of local needs a number of small manufacturing establishments are maintained, the chief products being coarse textiles, hats, leather, shoes, pottery, cement tiles, cigars, musical instruments, furniture, agricultural implements and liquors. The salt industry is important on the Pacific coast and there are salt mines in Huehuetenango and Verapaz. In 1915 the production amounted to 12,880,000 pounds.

Communication.— Steamers of the coastwise service between San Francisco and Panama make regular calls at San José, Ocós and Champerico. From New York to Puerto Barrios, passengers and freight are carried by two steamship lines. The steamers of the American Fruit Company ply between New Orleans and Puerto Barrios. The Central Railway, the first line built in Guatemala, was completed in 1882 to connect the port of San José with Guatemala City. In 1904 the Guatemala Railway Company was incorporated under the laws of the State of New Jersey; and in 1912, this latter concern affected a union of the principal railways of the Republic, the Central, the Occidental and the Ocos railroads, under the title of the International Railways of Central America. Under this consolidation, the Occidental is considered as a separate road, a majority of the stock of which is in the hands of the new corporation. The International Railways, which have a total length of 520 miles include the line from Puerto Barrios on the Atlantic, to San José on the Pacific (270.5 miles); that from Santa Maria to Mazatenango (63 miles); that from Mazatenango to Puerto Champerico (42 miles); the branch to San Telipe (9 miles); that from Ocos (port) on the Pacific by way of Ayutta (on the National Railways of Mexico) to Vado Ancho (51 miles); that from La Union, on the Pacific to Lempa River (84 miles). Several other branches are projected or actually under construction. By the railway concessions the government of Guatemala has the right to purchase the property at an arbitrary price in some cases, while in others the lines revert to the nation without any payment at the end of a certain time. There are some short private industrial lines which are not in the hands of the management of the International Railways, which is closely allied to the corporation which controls the United Fruit Company. The latter has made of Puerto Barrios a good modern port. The Pacific ports of the republic are still mere open roadsteads with very irregular steamship service. The republic had in actual operation in 1916 about 4,300 miles of telegraph and telephone wires, with over 333 offices and stations.

Finances.— The foreign debt is held mainly in England and Germany, and interest on it is already about 18 years in arrears; the total public debt being approximately $17,600,000 gold, of which about $12,000,000 (including arrears of interest) is the present amount of the foreign debt. The public revenues are derived chiefly from duties on imports and an export tax on coffee. The budget for 1915–16 was estimated at 60,082,640 pesos paper, or a little more than $3,000,000. In 1916 the republic sustained its foreign credit by an advance payment of 4 per cent on the English debt. Guatemala has nominally the silver standard. The present currency, however, is inconvertible paper, which although it circulates freely in the republic, has no fixed value in relation to gold or foreign exchange. The silver peso, divided into 100 centavos and weighing 25 grammes of silver, .900 fine, or say 22.500 grammes fine silver, was adopted in 1870 as the monetary unit. It is in reality the unit of account. At present, practically no gold or silver coins circulate. The principal banks — all located in Guatemala City — are the Banco Americano de Guatemala, Banco de Guatemala and Banco Internacional.

Guatemala is administratively divided into 22 departments. The total area of the republic is estimated at 48,290 square miles and the population in 1916 was estimated at 2,119,165. The departments, with their capitals and the populations of the latter, are as follows:

DEPARTMENT	Capital	Population
Alta Verapaz	Cobán	30,770
Amatitlan	Amatitlan	8,408
Baja Verapaz	Salamá	10,608
Chimaltenango	Chimaltenango	3,749
Chiquimula	Chiquimula	12,562
El Petén	Flores	1,671
El Quiché	Santa Cruz	11,914
Esquintla	Esquintla	12,343
Guatemala	Guatemala City	90,000
Huehuetenango	Huehuetenango	10,279
Izabal	Livingston	1,978
Jalapa	Jalapa	12,246
Jutiapa	Jutíapa	11,023
Quezaltenango	Quezaltenango	32,000
Retalhuleu	Retalhuleu	6,327
Sacatepequez	Antigua	10,150
San Marcos	San Marcos	6,036
Santa Rosa	Cuajiniquilapa	3,062
Sololá	Sololá	7,627
Suchitepequez	Mazatenango	6,970
Totonicapam	Totonicapam	28,310
Zacapa	Zacapa	11,964

Full-blooded Indians are much more numerous in Guatemala than in other Central American countries; in fact they, with the Indians of mixed blood, ladinos and mestizos, make up the bulk of the population. The natural increase among these people is indicated in the report of the secretary of public works for 1901, which shows 66,728 births in that year against 35,618 deaths, a gain of 31,110 persons. The total number of inhabitants in 1916 was given as 2,119,165.

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GUAVA, gwä'vä, the name of several tropical plants of the myrtle family which yield delicious fruits. The common guava (*Psidium guajava*) is a low bush tree, bearing fragrant white flowers on solitary axillary stalks, from each of which develops a fruit larger than a hen's egg, roundish or pear-shaped, smooth, yellow; the rind thin and brittle; the pulp firm, full of bony seeds, aromatic and sweet. The jelly or preserve made from it is highly esteemed, and pleasantly mingles tartness with sweetness. The rind is stewed with milk, and is also made into marmalade. This fruit is rather astringent than laxative. Guava buds, boiled with barley and licorice, make a useful astringent drink in diarrhœa. This guava is now naturalized in all the warmer parts of the world, and in many, especially Ceylon, has run wild. The common guava and the Cattley or strawberry guava (*P. cattleianum*) are grown extensively in Florida and southern California. Several other species are cultivated; as the mountain guava of the West Indies (*P. montanum*) and the marangaba, a dwarf species (*P. pygmæum*) of Brazil, with fruit no larger than gooseberries. See GUAYABO.

GUAVIARE, gwä-vē-ä'rä, or **GUAYABERO**, gwī-ä-bä'rō, a river of Colombia, South America, which rises in the Cordillera Oriental near Bogotá, flows eastward for 750 miles, forms the boundary between the departments of Cundinamarca and Cauca, and joins the Orinoco near San Fernando de Otabapo. It is navigable for nearly 500 miles.

GUAVO, any of various trees of the mimosa family and genus *Inga*, growing in Costa Rica and other parts of Central America. Their leaves have six to eight leaflets and the flowers are very conspicuous by reason of their long feathery, white filaments. The fruit is a huge pod, varying in shape but usually flat, like that of the lima bean; in one species it is 2 inches wide and 12 inches or more long. The beans of some species, especially *Inga edulis*, are embedded in a sweet white pulp that has a pleasant taste and is commonly eaten by children. These trees are good nitrifiers.

GUAYABO, gwī-yä'bō, the tree (*Psidium guajava*, family Myrtaceæ) from whose fruit guava jelly is made. The guayabo of Costa Rica grows to 25 or more feet in height, often in groves and resembles in growth and habit of branching, a neglected old apple-tree. The outer layers of the bark peel off and curl up lengthwise of the stem into tight rolls, and there gradually drop off, the result of which is that this tree remains free of epiphytic plants. Its fruit is cherry-like in shape, growing in groups of three, ripens in mid-autumn and is used mainly for making guava jelly and other sweetmeats. Although eaten cooked, as a rule, it is very good raw when ripe, but rarely reaches perfection because so many birds and other animals are fond of it. It is usually gathered and cooked while still green.

GUAYAMA, gwī-ä'mä, Porto Rico, town in the department of Guayama, near the port of Arroyo and the southeastern corner of the island. The surrounding region is very fertile. Pop. 8,321.

GUAYAQUIL, gwī-ä-kēl', Ecuador, a seaport city, the capital of the province of Guayas, on the river Guayaquil, 25 miles above its mouth in the Gulf of Guayaquil, on the Pacific Ocean. The site is low and unhealthful, but the sanitary conditions have been improved by a modern system of waterworks and of drainage. Other modern improvements include street railways, gas-lighting and telephone service, while a railroad connects with the interior. The chief buildings are the custom house, town hall, a college, technical school and the cathedral. Vessels of 18 feet draught reach the town, and the river and its tributary, the Daule, are navigable for smaller vessels, a considerable distance above the town. The export trade averages $6,500,000 annually, cocoa representing nearly five-sixths, the rest being, coffee, ivory-nuts, rubber, hides and specie. Cottons, hardware and other manufactured articles are imported. The industrial establishments include steam sawmills, foundries, machine-shops, ice factories and a large brewery. The town was founded 25 July 1531, on Saint James' day, whence its official title Santiago de Guayaquil. It has had an eventful history, being attacked by pirates, Dutch, French and English, and suffering from disastrous conflagrations, on the last occasion in 1896. Pop. about 55,000.

GUAYAQUIL, a gulf of the Pacific, in the republic of Ecuador. It has a wide entrance, narrowing as it extends inland, and receiving at its head the Guayas River, which has at the city of Guayaquil a depth sufficient to admit the vessels of the Pacific Steam Navigation Company and other lines engaged in West Coast passenger and freight service. In this gulf and lying between the city and the Pacific Ocean is the island of Puná.

GUAYAQUILLITE, gwī-ä-kē'lēt, a fossil resin found in extensive quantities near Guayaquil, Ecuador, where it has formed part of the commerce of the country for centuries. In pre-Columbian times it was offered to the gods on certain set occasions each year. It is of a pale yellow color and can be easy pulverized.

GUAYAS, gwī'yạs, South America, a river of Ecuador. It rises in the western Andes, flows southwest draining a basin of some 15,000 square miles and empties into the Gulf of Guayaquil.

GUAYMAS, gwī'mäs, Mexico, city in the State of Sonora. It is situated on the Gulf of California, and owes its importance to its harbor, its railway connections and to the proximity of the valuable mining and grazing regions in the northwestern part of the republic. Exports are gold, silver, hides, etc. Pop. about 9,000 in 1917.

GUAYRÁ (gwī-rä') **FALLS**, Brazil and Paraguay, a cascade of the Paraná River, on the boundary between the countries mentioned; the result of a contraction of the river-bed from a width of 4,470 yards into a narrow gorge, 65 yards wide, the waters making a plunge of 56 feet. «These falls, situated in the midst of a desolate region, far from human habitation, and rendered almost inaccessible by virgin forests, rapids, and other obstacles, have been visited by very few, though they are said to form one of the grandest spectacles in the world. The volume of water which passes over them is twice that of Niagara.» Consult ‹Paraguay› (2d ed. revised by J. S. Decoud, Washington, Government Printing Office 1902).

GUAYULE, gwa-yoo'la, or **HUAYULE**, rubber obtained from a shrub (*Parthenium argentatum*) of the family Compositæ, common in Mexico. This shrub seldom exceeds three feet in height, has lanceolate leaves and gray bark on stem and twigs. It grows in New Mexico and Texas, but is of commercial importance only in the Mexican states of Coahuila, Chihuahua, Durango, San Luis Potosi and Zacatecas. To obtain the rubber the entire plant is dried and the rubber extracted from bark and wood by patented processes. The plant is now grown artificially as the nature supply was insufficient to meet the demands of commerce. The Mexican crop in normal years is about 10,000,000 pounds and forms the basis of a great industry. Consult Lloyd, ‹Guayule, a Rubber Plant of the Chihuahuan Desert› (Carnegie Institute, Washington 1911).

GUAZUMA, gwä-soo'mä, a genus of shrubs or small trees, native of Mexico, Central America and some of the West Indies, the leaves of which are used extensively as fodder for cattle and more especially for horses and mules. It very much resembles the elm in general appearance, bears a tuberculated fruit and fibrous roots that yield a strong and excellent fiber. It has been naturalized in Europe and India.

GUBAT, goo'bät, Philippines, a pueblo of the province of Sorsogón, Luzon, on the east coast of the Bay of Gubat, 11 miles southeast of the provincial capital Sorsogón. The waters of the bay were formerly infested by pirates, who terrorized the surrounding region. Pop. about 16,000.

GUBBIO, goo'bē-ō, Italy, city in the province of Perugia, Umbria, 70 miles east-southeast of Arezzo and 23 miles north-northeast of Perugia. Gubbio is a quaint mediæval town, straggling up the side of the hill, some 1,700 miles above sea-level. It contains several fine old buildings: the Palazzo dei Consoli, dating from the 14th century; the Residenza Municipale (formerly the Palazzo della Podestà) which contains the Eugubine Tablets and some excellent specimens of Umbrian paintings, furniture and majolicas; the Palazzo Ducale, the ancient residence of the Dukes of Urbino; the Palazzo Beni; and the Palazzo Accoramboni. The churches include the cathedral of Saint Mariano e Jacopa, Saint Francesco and Saint Maria Nuova and Saint Pietro. It is an episcopal city, and became a possession of the Pope in 1624. The procession of the Ceri is held here annually on 15 May in honor of Saint Ubaldo, who, as bishop, saved it from siege by Frederick I. The chief manufactures are linen and silk. Trade is carried on in cattle, grain, wine and oil. Gubbio has been famous for its majolicas ever since Giorgio Andreoli perfected their manufacture. It is also the birthplace of Oderisio, a miniature painter, and of several lesser artists whose works are found in the various churches. Pop. of town, about 6,000; of commune 27,500.

GUBEN, goo'bĕn, Germany, a town in Brandenburg, at the junction of the Lubis and the Neisse rivers, 28 miles south-southeast of Frankfort-am-Oder, having railway connections with Breslau, Halle and Forst. The chief industries are dyeing, tanning, hat, cloth, paper, cardboard and wool manufacture; and there is trade in fruit, vegetables and wine. It fell into the hands of Prussia in 1815. Pop. 38,600.

GUBERNATIS, goo-bĕr-nä'tēs, **Angelo de**, Italian Orientalist: b. Turin, 7 April 1840; d. 1913. He was educated at the University of Turin, and went to Berlin in 1862 to study philology. He was appointed professor of Sanskrit in the Instituto degli Studi Superiori, Florence. Owing to Socialistic tendencies he resigned, changed his views again and was reappointed in 1867. He went to the University of Rome in 1867. The ‹Zoölogical Mythology› (1872) brought him international fame. He founded the Italian Asiatic Society in 1886 and wrote much in various departments. Among his works are ‹The First Twenty Hymns of the Rig-Veda› (1865); ‹Death of Cato› (1863), a metrical drama; ‹King Nala,› an Indo-Brahmin play; ‹Gabriel,› a novel and ‹Dictionnaire International des Ecrivains du Jour›; ‹Dizionario degli artisti italiani viventi› (1889–92); ‹Storia universale della letteratura dai primi tempi e presso tutti i popoli civili fino ai nostri giorni, con florilegi da ogni letteratura› (1882–85). He founded and edited several periodicals *La letteratura civile* (1889); *Italia letteraria* (1862); *La Civiltà italiana* (1865); *Rivista orientale* (1867–68); *Rivista europea* (1869–76); *Bolletino italiano degli studi orientali* (1876 et seq.); *Revue internationale* (1883–87). He also directed the *Giornale della società asiatica italiana* after 1887.

GUDDEN, goo'dĕn, Bernhard von, German physician: b. Cleves, 1824; d. 1886. He studied at Bonn, Berlin and Halle, where he undertook special work in the care of the insane. After rendering important medical service at the asylums at Siegburg, Illenau, and Würzburg, he became professor of psychiatry at Zurich (1869); at Munich, three years later; and was ennobled in 1875. In that year he was appointed physician in charge of the mad King Louis II, and ended his life by his efforts to save the king from drowning in Starnbergersee. His publications include ‘Beiträge zur Lehre von der Scabies’ (2d ed. 1863); ‘Experimentaluntersuchungen über Schädelwachstum’ (1878). His posthumous papers were edited by Grashey. Gudden was also one of the editors of ‘Archiv für Psychiatrie und Nervenkrankheiten’ (1868 et seq.).

GUDEMAN, Alfred, American philologist: b. Atlanta, Ga., 26 Aug. 1862. He studied at Columbia University, and then took his doctor's degree at the University of Berlin. On his return to the United States he became professor of Greek and Latin at Johns Hopkins (1890–93); University of Pennsylvania (1893–1902); Cornell (1902–04). Since 1904 he has been at Munich, engaged in important philological work on the ‘Thesauraus Linguæ Latinæ.’ His published works include editions of ‘Tacitus,’ ‘Agricola,’ ‘Germania,’ ‘Dialogus de Oratoribus’ and Sallust's ‘Catalina.’ He also wrote ‘History of Classical Philology’ (1902); ‘The Sources of Plutarch's Life of Cicero’ (1902); ‘Grundniss der Geschichte der Klassischen Philologie’ (2d ed. 1909); ‘Imagines Philologorum,’ a series of sketches of famous classical scholars (1910) and contributed many articles to Johnson's ‘Encyclopædia,’ Pauly-Wissowa's ‘Realencyclopedie’ and to various journals and periodicals.

GÜDEMANN, Moritz, Austrian scholar: b. Hildesheim, Germany, 19 Feb. 1835. Called first to Magdeburg (1862) and then to Vienna in 1866, in the latter city he developed his literary activity in connection with his work as rabbi. He directed his attention chiefly toward the history of Jewish education and culture, one of the few authorities in that rich field, for his style, learning, and accuracy. His chief books in this department are ‘Jewish Education during the Spanish-Arabian Period’ (1873); ‘History of Education and Culture of the Western Jews’ (3 vols., 1880–88); ‘Sources for the History of Instruction and Education among the German Jews’ (1894).

GUDGEON, gŭj'ŏn, a small European fresh-water fish (*Gobio fluviatilis*) of the carp family. It swims in shoals, and affords great sport to anglers from its greediness in seizing upon any bait presented. Its name has therefore come to mean a person easily «fooled» to his hurt.

GUDRUN, goo-droon', a Middle High German folk epic composed by an unknown poet in Bavaria or Austria about 1210. It is a companion piece to the ‘Nibelungenlied,’ of which it is an evident imitation, as is shown, among other things, by the form of the strophe, which is only a variant of the Nibelungen strophe, having five accents in the last half of the fourth line instead of four. Just as the ‘Nibelungenlied’ has been called a German Iliad, so the ‘Gudrun’ may be considered a German Odyssey, not only because of its happy ending, but because of the many combats and adventures on the sea and adjacent shores. In this respect the poem occupies a unique position in German literature. In marked contrast to English, German poetry has rarely concerned itself with the sea. The ‘Gudrun,’ however, reflects the desperate battles of early Teutonic times between the Vikings and the Danes along the shores and islands of the North Sea. Like the ‘Nibelungenlied’ the ‘Gudrun’ is based on earlier ballads which have been welded into one long epic of over 6800 lines. It stands in close relation to minstrel epics like ‘Duke Ernst’ and ‘King Rother,’ as it introduces features taken from the orient, and describes a journey for a bride. It portrays the adventures of three generations of the same family, and may therefore be divided into three distinct parts, each of which is based on a separate saga. The first relates the story of Hagen of Ireland who was carried away as a child by a gigantic bird and dropped on a desert island where he grew up with three princesses who had been abducted in a similar manner. Finally they are rescued by a passing ship and returned to Ireland, where Hagen marries Hilde, the fairest of the three maids. This part is probably original with the author of the poem, and is a mixture of motifs taken from various minstrels and courtly epics. The second part tells the story of Hilde, the daughter of Hagen, an old saga related by Snorri Sturleson, the author of the ‘Edda,’ and the subject of a Danish ballad. It describes how Hetel, the king of the Hegelings sends Wate and other warriors disguised as merchants to obtain for him the hand of Hilde, the daughter of Hagen, who had refused all suitors and had hanged the messengers. By selling their wares under price and by the entrancing singing of the minstrel Horand they lure the princess on board one of their ships and carry her away before her parents' eyes. Hagen pursues them as soon as his leaky ships can be made ready and a fierce fight ensues upon the strand of Hetel's land. Hetel is wounded by Hagen and the latter by Wate. Hilde intercedes for the life of her father, who now consents to her marriage with Hetel. The third part deals with the adventures of Gudrun, again the theme of a separate ballad and to a certain extent a repetition and extension of the Hilde saga. It relates that two children, Ortwin, a son, and Gudrun, a daughter, are born to Hetel and Hilde. So great is Gudrun's beauty that several warriors sue for her hand. Siegfried of Morland, and Hartmut, son of King Ludwig of Normandy, are rejected and depart. A third, Herwig of Seeland, is likewise refused, but he attacks Hetel's castle and by his bravery succeeds in winning the heart of Gudrun and becomes engaged to her. When Siegfried learns this, he attacks Herwig's land. Hetel and Herwig set sail to defend it. While they are absent, Hartmut and his father descend on Hetel's land and abduct Gudrun and her maidens. Called home by messengers, Hetel and Herwig pursue and overtake the abductors upon an island where they are resting. A fierce battle ensues in which Hetel falls by Ludwig's sword. The Normans escape in the darkness with Gudrun; and when she refuses to marry Hartmut, she is treated with great cruelty by his mother Gerlind and is made to perform the most menial tasks. For 13 years she endures this life, sustained by her love for Herwig. One morning when washing clothes on the seashore, barefoot in the snow, she and the faithful Hildeburg see a bark approaching, bearing two men. These prove to be Gudrun's brother Ortwin and her lover Herwig. After a touching reconciliation the young men depart and next morning attack Hartmut's castle. In the battle that follows Ludwig is killed by Herwig, Hartmut and 80 knights are taken prisoners, and all others are slain. Wate forces an entrance to the castle and kills even the children in the cradle that they may not live to grow up to harm them. He beheads Gerlind with his sword, but spares the life of Hartmut's sister Ortrun, who had been kind to Gudrun. Their mission accomplished, the warriors return to Hegelingen, where Gudrun is joyfully received by Hilde. The old feud is peacefully settled by the marriage of Ortwin to Ortun and of Hartmut to Hildeburg. Siegfried marries Herwig's sister and Herwig is happily united to Gudrun.

The Gudrun is to-day ranked next to the 'Nibelungenlied' but it is much less virile and dramatic and much more lyrical and romantic than the latter. In both poems the main character is a woman, but whereas Kriemhild plays an active part in the vengeance visited upon her brothers for the murder of Siegfried, Gudrun is the type of the passive, untutored woman of an earlier age, patiently enduring all hardships, unswerving in her fidelity to her lover through weary months and years. For some reason the poem was not very popular during the Middle Ages and has been preserved for us only in one late manuscript, the so called *Ambras* Ms. containing several Middle High German epics, compiled at the instance of Emperor Maximilian at the beginning of the 16th century. It was discovered in 1817, but excited little or no attention at first. Not till 1837 did an edition in Middle High German appear. The best editions are those of Martin (1873; 2d ed. 1902); Bartsch (4th ed., Halle 1880); Piper (1895); Kürschner's 'National-Literatur'. F. Panzer has written on the sources; 'Ueber Sage und Dichtung der Hilde-Gundrun Sage' (Halle 1901). Good German translations have been made by Simrock (1893); Klee (1878); L. Freytag (1888); Lagerlotz (1900) and an English rendering by M. P. Nichols (Boston 1889). Full English bibliography will be found in F. E. Sandbach, 'The Nibelungenlied and Gudrun in England and America' (London 1904). It has been made the theme of several German dramas, none of any importance. Consult Siegmund Benedict 'Die Gudrunsage in der neueren deutschen Literatur' (Rostock 1902).

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GUEBERS, gē'bėrz, also **GHEBERS, GABERS, GHAVERS, GEBIRS** (Turkish Ghaur or Ghiaur, infidel, generally but probably wrongly derived from the Arabic kâfir), a name applied by Mohammedans to the adherents of the ancient religion of Zoroaster, who reside in Persia. They originally were subjected by the Mohammedans to much cruelty, but are now permitted a great degree of religious freedom. Those who fled to India are known as Parsis (q.v.).

GUÉBRIANT, gā'brē'äṅ', **Jean Baptiste Budes**, Count de, French marshal: b. Plessis-Budes, Bretagne, 1602; d. Rottweil, Swabia, 1643. He saw service first in Holland and later was placed in charge of the French troops which were sent to the assistance of Germany (1639). At the head of the allied troops he defeated the Imperial forces at Wolfenbüttel (1641) and at Kempen in the succeeding year. Here he was raised to the rank of marshal. While conducting the siege of Rottweil in Swabia, he lost his life. Consult Le Laboureur, 'Histoire du mareschal de Guébriant' (1656).

GUELDER (gĕl'dėr) **ROSE**, or **SNOWBALL**, a cultivated variety of the *Viburnum opulus*, or water elder, of the order *Caprifoliaceæ*. In the European wild form, the inflorescence is a dense cyme whose outer flowers are barren and enlarged, but in the cultivated form all the flowers are neuter and consequently the plant can never set seed. A yellow dye is obtained from it, and the wood is sometimes employed in making tobacco-pipes and other articles.

GUELDERS, gĕl'dėrz, or **GUELDERLAND.** See Gelderland; Netherlands.

GÜELL Y RENTÉ, goo-ely' ē rān-tā', **Jose**, Cuban author: b. Havana, Cuba, 14 Sept. 1818; d. Madrid, 20 Dec. 1884. He studied law in Havana and Barcelona and practised his profession in his native city. In 1848 he went to Spain where he married Josepha de Bourbon, sister of the king. Besides several novels he published 'Philippe II, et Don Carlos devant l'histoire' (1878), and other works.

GUELPH, gwĕlf, Canada, city and county-seat of Wellington County, Ontario; on the river Speed, and on the Grand Trunk and Canadian Pacific Railways, 48 miles west of Toronto; founded by John Galt, the Scottish novelist (q.v.), in 1827. The river affords abundant water power and the city, in a rich agricultural and cattle-raising district, enjoys a large trade. It is an inland port of entry and is the seat of a United States consulate. A fat stock show is held annually in December. It has breweries, large flour, saw and planing-mills, and manufactories of foundry products, machinery, pipe and tubing, musical instruments, sewing machines, agricultural implements, woolen goods, carpets, furniture, carriages, leather, soap, boots and shoes, etc. Good building stone is quarried in the vicinity. There are eight public parks. The city owns and operates its electric light, gas and power, its waterworks and street railway and also owns the Guelph Junction railway. It is the seat of the Ontario Agricultural College (q.v.) and of the Macdonald Institute of Domestic Science. Pop. 15,175.

GUELPHS, or GUELFS, and GHIBELLINES, names of rival political parties in Italy during the Middle Ages. The words are of German origin, derived respectively from Welf, the name of a princely family in Bavaria (from which is descended the royal Brunswick line and the line of Este), and Waiblingen, the name of a castle in Würtemberg belonging to Conrad of Hohenstaufen, the German emperor. In the great battle of Weinsberg, 1140, the war-cry of the partisans of Conrad was «Hie Waiblingen,» that of the adherents of the Duke of Saxony (of the house of Welf) was «Hie Welf.» Some years after when the effort was made by the popes and various states and princely houses of Italy, among them the house of Este, to consolidate opposition to the emperor, the two German words, changed to Guelfo, Guelfi (plus), and Ghibellino, Ghibellini, were adopted as party designations by the Italians. At first and for a long time after the assumption of these names by the great parties in Italy, Guelf and Ghibelline, did really designate two opposing national policies — the policy of the dependence of the several states of the Peninsula on the empire, and the policy of Italian independence of Germany, and of resistance to imperial absolutism. The states of northern and of central Italy were divided in their allegiance and they were continually passing from one side to the other, but they were predominantly Ghibelline; the states of southern Italy were always Guelf. The popes were the mainstay of the Guelf party and thus were the assertors of the policy of Italian independence and home rule. As usual with party designations, «Guelf» and «Ghibelline» continued in use as the names of factions in no wise concerned with the question of imperialism. See ITALY — HISTORY OF MIDDLE AGES.

GUELPHS, Order of, frequently styled the **GUELPHIC ORDER,** an order of knighthood instituted for the kingdom of Hanover in 1815 by the prince-regent of England and Hanover, afterward George IV, of England, and conferred by the kings of Hanover until the absorption of that kingdom by Prussia in 1866.

GUEMAL, gwā'māl, either of two species of small Andean deer (*Cervus chilensis* or *C. antisensis*), whose antlers have only one forking — a long brow-tine projecting straight forward; which have tusks in the upper jaws in both sexes; and whose fawns are not spotted.

GUEMEZ DE HORCASITAS, gwā'māth dā ôr-kā'sē-tạs, **Juan Francisco Conde de Revilla Gigedo,** Spanish military officer: b. Oviedo 1682; d. 1768. For his effective service at the siege of Gibraltar and at Oran he was appointed field marshal. Later he became governor of Cuba (1734) and Viceroy of New Spain (1746). It was under his rule that the fortifications of Vera Cruz and Acapulco were constructed. On his return to Spain (1755) he was made captain general of the army and president of the war council.

GUEMEZ, Pacheco De Padilla Horcasitas, pa-chā'kō dă pā-dē'lya, **Juan Vincente, Conde de Revilla Gigedo,** Spanish provincial governor: b. Havana, 1740; d. 1799. At the siege of Gibraltar he was lieutenant-colonel of the Spanish Guards and rendered important service. From 1789–94 he was Viceroy of New Spain, where he proved himself a most able administrator of internal affairs. After he had been superseded, he became director of the artillery of the Spanish army.

GUENON, a group of African monkeys of the family *Cercopithecus,* and including several species. They are very small and being hardy and easily tamed are well represented in zoological parks and menageries. They are also the type found with organ grinders and in general the pet monkeys found all over the world. In their native haunts they live in trees and great numbers usually inhabit the same district, the family being gregarious.

GUÉRARD, gārār', **Adolphe,** French engineer: b. Vosges, 1841 After receiving his education at the École des Ponts et Chaussées, he entered the army engineering corps. He executed a number of important commissions for the French government, including the canal connecting the port of Saint Louis with the mouth of the Rhone; various improvements on the Rhone channel; and the the harbor at Marseilles. Representing France, he was a member of the International Commission for bettering the sanitation at Cairo (1892); of the International Consulting Commission of the Suez Canal Company (1895); of the Consulting Board of Engineers of the Isthmian Canal Commission (1906).

GUERCINO DA CENTO, gwĕr-chē'nō dā chĕn'tō, Italian painter: b. Cento, duchy of Ferrara, 1580; d. Bologna, 1666. His proper name was GIOVANNI FRANCESCO BARBIERI, and he was called Guercino from a squint in his eyes. In 1621, having already acquired renown as a painter, he was invited by Pope Gregory XV, to Rome, but the premature death of this pontiff induced him to return to his native town two years after. About 1642 he went to Bologna, where Count Aldovrandi received him in his palace and entertained him with the most magnificent hospitality. Guercino adopted three different manners of painting, the first in imitation of Caravaggio, which being very dark, he quitted for that of the Caraccis, and latterly for a style still more light and sketchy; but his middle style is his best. He painted over 250 altarpieces and large historical works, beside frescoes. His chief pictures are at Rome. The most celebrated is that of the 'Martyrdom of Saint Petronilla' which has been copied in mosaic to adorn one of the panels in Saint Peter's between the 'Transfiguration' by Raphael, and the 'Communion of Saint Jerome,' by Domenichino. His other chief pictures include a 'Saint Anthony' at Padua; an 'Annunciation' at Milan; 'Saint Peter' at Modena; 'Cephalus and Procris,' and a scene from the 'Pastor Fido' in the Dresden gallery; the 'Parting of Priam and Hector' at Marseilles. The galleries of Bologna, Florence and Paris, besides some of those of England and Germany, also possess specimens of this master.

GUEREZA, gĕr'ĕ-zạ, or **GUERZA,** gĕr'za, (*Colŏbus guerza*), an Abyssinian monkey remarkable for its beauty. Short, glossy, jet-black fur covers its limbs, back and head, while a long fringe of silky white hair depends from the flanks. It frequents lofty trees and is much sought for the sake of its valuable fur.

GUERICKE, gā'rik-ẹ, **Otto von,** German scientist: b. Magdeburg, 20 Nov. 1602; d. Hamburg, 11 May 1686. He studied law at Leipzig, Helmstadt and Jena, and then took up mathematics and mechanics at Leiden. After traveling in France and England, he returned to his native city and was elected mayor in 1646. His studies of Galileo and Pascal to which he devoted his spare time aroused his interest in the subject of the weight of air and the creation of a vacuum. After several attempts, he finally succeeded in creating a vacuum by means of a copper globe fitted with a pump and stop clock. This was effective in pumping out air as well as water, and was the first air pump. The fame of this experiment reached the ears of the Emperor Ferdinand IV, who summoned Guericke to the court for a demonstration. The experiment was performed with two copper hemispheres and came to be known as the «Magdeburg Hemispheres.» He also began some researches in electricity using a rolling ball of sulphur to create friction. The results of his study were published in his ‹De Vacuo Spatio› (Amsterdam 1672). Consult Hoffmann, F. W., ‹Otto von Guericke› (Magdeburg 1874).

GUÉRIN, gā-răṅ, **Eugénie de**, French writer: b. Cayla, Languedoc, 1805; d. 31 May 1848. She was a sister of G. M. Guérin (q.v.) and much of her life was devoted to taking care of him. Her ‹Journals and Letters,› of which an English translation appeared (1865–66), have been widely read in America, both for their charm of style and their devotional spirit. Consult Parr, ‹Maurice and Eugénie de Guérin› (1870).

GUÉRIN, Georges Maurice, French poet: b. Languedoc, 4 Aug. 1810; d. Paris, 19 July 1839. He was for a time a member of a religious house in Brittany, but in 1833 went to Paris and taught in the Collège Stanislas. His verse has been greatly admired by critical readers. Sainte Beuve in 1860 edited his ‹Reliquæ› with critical notice, and the poet forms the subject also of one of Matthew Arnold's ‹Essays in Criticism› (1865). Consult Parr, ‹Maurice and Eugénie de Guérin› (1870).

GUÉRIN, Jules, American artist: b. Saint Louis, Mo., 1866. He was a pupil of Benjamin Constant and of Jean Paul Laurens in Paris. He was elected a member of the National Institute of Arts and Letters and has received several awards in recent years. He is regarded as one of the leading mural decorators in the United States. He executed the artistic map decorations in the waiting room of the Pennsylvania Station, New York, and had entire charge of the decorations for the Panama-Pacific Exposition of 1915 at San Francisco. In 1916 he received the commission for decorating the new Lincoln Memorial in Washington, D. C.

GUÉRIN, Pierre Narcisse, Baron, French artist: b. Paris, 13 May 1744; d. Rome, 6 July 1833. He studied under Jean Baptiste Regnault, and early showed great promise. His first prominent picture was ‹Return of Marcus Sextus› which was received with great acclaim by his contemporaries. This was followed by ‹Grave of Amyntas› (1800); ‹Phaedra and Hippolytus› (Louvre 1802); ‹Cephalus and Aurora› (1802); ‹Bonaparte and the Rebels of Cairo› (Versailles 1802); ‹Pyrrhus and Andromache›; ‹Æneas and Dido› (1813); ‹Chytemnestra› (1817) in the Louvre. In 1882, Guérin, his best pictorial work done, became director of the École de Rome. Six years later he was raised to the nobility with the title of Baron, but did not remain long at Paris, because of his failing health. He was the recipient of many honors, becoming a member of the Academy (1815); of the Order of Saint Michel (1819); and Officer of the Legion of Honor (1832). His most famous pupils were Delacroix and Géricault. Guérin's work was dignified, restrained and of high dramatic interest.

GUERNSEY, gėrn′zē, the second largest and the westernmost of the Channel Islands (q.v.), 46 miles southwest of Cherbourg, France, and 69 miles from Start Point, Devonshire, England. It is triangular in form, nine miles long and from three to five miles broad. The picturesque south coast is lofty and abrupt, the island sloping towards the north, which is low and level. Guernsey is noted for its healthful climate, for the fertility of its soil, for its horticultural and floricultural products grown chiefly under glass and for its magnificent breed of cattle. The chief towns are Saint Peter Port (q.v.), the capital, and Saint Sampson, the latter with an important export trade in blue granite. With the adjacent islands of Sark, Alderney, Herm and Jethow, Guernsey forms an autonomous bailiwick. Its area is 19 square miles and the number of inhabitants, including outlying small islands, about 45,000.

GUEROULT, gā′roo′, **Adolphe**, French journalist: b. Radepont, 1810; d. 1872. He first wrote articles for the *Journal des Débats* in support of the economic principles advanced by Saint Simon. He was correspondent for this paper in Italy later. In 1842 the French government appointed him consul at Mazatlan, Mexico, and five years later at Jassy, Roumania. From 1848–57 he pursued the profession of journalist at Paris and was editor of *La Presse*. Under his direction a new democratic paper was established in 1859, under the title *L'Opinion Nationale*. He sat in the Corps Legislativ 1863–70. His sympathies were with the republic and popular rights and he cast his vote for the abolition of the monarchy in 1870. He was author of ‹Lettres sur l'Espagne› (1838); ‹De la question coloniale› (1842); ‹La politique de la Prusse› (1866); ‹Discours prononcés au Corps legislatif› (1866); ‹La République en France› (1871).

GUERRAZZI, Francesco Domenico, Italian statesman and author: b. Leghorn, 12 Aug. 1804; d. 25 Sept. 1873. He was educated for the legal profession, won reputation among his countrymen by his political fictions, said to have had immense influence on contemporary Italian events by their patriotic enthusiasm and abhorence of despotism. Guerrazzi's own words are, «he wrote a book when impotent to fight a battle.» He became acquainted with Mazzini, and was several times imprisoned for his writings in behalf of Young Italy. In 1848 he entered the Tuscan ministry and when the grand duke fled the following year Guerrazzi, Mazzini and Montanelli formed a triumvirate, and subsequently Guerrazzi became dictator. He was imprisoned for three years after the restoration. His defense entitled ‹Apologia della vita politica di F. D. Guerrazzi› is a masterpiece. After his release from prison he was allowed to select Corsica as his place of exile. Political changes brought about his release and in 1862 and 1865 he was a member of the Turin Parliament. His chief works of fiction are ‹L'Assedio di Firenze,› a fine historical novel treating of the downfall of the Republic of Florence; ‹La Battaglia di Benevento,› remarkable for exquisite expression; ‹Beatrice Cenci›; ‹Isabella Orsini›; ‹L'Asino›; and various other writings, which have run through innumerable editions and translations. Consult his ‹Memorie› (Florence 1848); Bosio, ‹Opere, Vita di Guerrazzi› (Milan 1877); Vismara, ‹Bibliografia di Guerrazzi› (ib., 1880); Fenini, ‹Guerrazzi, studi critici› (ib. 1873) and ‹Lettre di F. D. Guerrazzi,› edited by Carducci (Leghorn 1883).

GUERRERO, gä-rä'rō, Mexico, a state bounded by the states of Michoacan, Morelos and Mexico on the north, Puebla on the northeastt, Oaxaca on the east and southeast, and by the Pacific Ocean on the southwest. Its area is given as 24,996 square miles. It is mountainous throughout almost its entire extent, the northern section being occupied by the spurs of the ranges of Morelos and Mexico, and the southern by the Sierra Madre del Sur. Between these two sections runs the Mexcala or Balsas River, to which all the streams of the state are tributary. The principal lakes are Pazahualco, Chantengo, San Marcos and Nexpa. The Pacific Coast line is low and sandy, and has excellent harbors. The bay of Acapulco, the chief port, is deep and spacious. The mineral resources of the state have been as yet very imperfectly developed. Gold, silver, lead, mercury, iron, coal, sulphur, marble, granite, opals, topazes, and diamonds are mentioned among its products. The climate is unhealthy. On the coast the heat (from 95° to 96.80° F.) and rainfall are both excessive; and in the belt above 6,500 feet, the cold is sometimes severe. Fevers, leprosy and affections of the respiratory and digestive organs are the prevailing diseases. The annual value of the agricultural products is about $2,200,000, and the total value of live stock is estimated at $3,000,000. Manufactures are limited to sugar-cane products, mescal wine, palm-oil, cotton fabrics and leather. Plans for a number of railways have been made, but have not been carried out. There are, however, telegraph and telephone lines, and a few wagon roads. Steamers of the Pacific Mail and the Mexican International Company touch at Acapulco. The state is divided into 14 districts: La Unión, Mina, Alarcón, Hidalgo, Alvarez, Zaragoza, Morelos, Abasolo, Allende, Tabares (chief town Acapulco de Juarez, with population of 5,780), Galena, Chilpancingo (principal town and capital of the state Chilpancingo de los Bravos, with population of 7,994), and Guerrero. Total population of the state 594,278 in 1910; somewhat more than 620,000 in 1917 (est.).

GUERRIERE, The. See CONSTITUTION, THE.

GUERRILLA, gė-rĭl'lạ, one of a band of irregular soldiers, organized independently of a regular army and government, and not responsible to any constituted authority. The name originated in the Spanish war for independence (1808–14), when the term guerrillas was applied to the bands of Spanish peasants, organized to harass the French armies that then occupied Spain. Guerrilla warfare was carried on to some extent during the Revolution and to a considerable degree in the Civil War, by southern sympathizers. Some of these irregulars, as Mosby's command, were very efficient fighters. (See MOSBY). During the war for the liberation of Cuba, guerrilla bands of Cuban patriots were common. The irregular bodies of Filipinos were properly guerrillas, as well as those of Villa and many mauraunding Mexican bands. The Hague Conference of 1899 defined the position of such troops in warfare, and these were again the subject of «rulings» in 1907. Of course no guerrilla band could be expected to pay much attention to the decisions of a peace conference when ignored by some of the most powerful nations.

GUERRINI, gwĕ-rē'nē, **Olindo,** Italian poet: b. Sant' Aberto, 1845. He received his education at Turin and Bologna, where he was trained for the law. But literary pursuits were more to his liking and became librarian at the University Library at Bologna. Under the pen-name of Lorenzo Stechetti, he wrote ‹Postuma, Canzioniere di Lorenzo Stechetti› (1877); ‹Polemica› (1878); ‹Canti populari romagnoli› (1880); ‹Brandelli› (1884); and with Ricci, ‹Il libro dei colori› (1887). He is the leading exponent of the «verist» school of Italian poetry. Of his more recent works are ‹Rime di Lorenzo Stechetti› (1903); and ‹Rime di Argia Stolenfi.›

GUESCLIN, Bertrand du. See DU GUESCLIN.

GUESDE, ged, **Jules Basile,** French socialist: b. Paris, 11 Nov. 1845. For some time he was employed as translator, but he soon abandoned this field and threw himself into the fight of the Republicans against the empire. He collaborated with Hérault in the latter's *La Liberté,* and subsequently established the *Droits de l'Homme* at Montpellier. In July 1870 he was sentenced to six months in prison because of his radical writings. In June 1871 he was again convicted because of his articles in favor of the Commune and sentenced to five years' imprisonment. He fled to Switzerland where he published his ‹Livre rouge de la justice rurale.› From Switzerland he went to Italy but was expelled from the latter country in 1872. He did not return to France until 1876 and soon after founded the radical weekly *L'Egalité,* in which he began the active Socialist propaganda to which he has ever since devoted himself. In 1878 he was condemned to six month's imprisonment for persisting, contrary to the orders of the chief-of-police, in holding a Socialist convention in Paris.

With splendid oratorical powers M. Guesde has been an effective propagandist of collectivism throughout France, holding numerous reunions of Socialists and wage-earners in Roubaix, Rheims, Saint-Quentin, Montluçon, Nantes, Lyon, Bordeaux, Montpellier and other cities. In 1880, in collaboration with Karl Marx, Engels and Paul Lafargue he submitted to the several labor unions and congresses an economic and political programme which was adopted by the Labor Party at the National Labor Congress at Havre. The Socialist group was soon broken up into two parties, one strictly Marxian and refusing all compromise with a bourgeois government, led by Guesde, the other, which was willing to compromise on social legislation and other matters, known as the Possibilists. There was constant bickering between the two factions and when Millerand accepted a Cabinet post Guesde determined to have him expelled from the Socialist party. He succeeded in doing so at the Amsterdam Socialist Congress of 1904, the Congress affirming Guesde's stand that a Socialist may not participate in a bourgeois government. The Unified Socialist party was formed soon after and in 1914 elected 100 members to the Chambre. In 1893 Guesde was elected Deputy from Lille and was re-elected regularly thereafter. After the outbreak of the war in 1914 Guesde for the first time in his career dropped somewhat his uncompromising attitude toward the government and denounced Germany as the arch-enemy of Europe, and scoring the Socialists of Germany as traitors to the cause of labor, Socialism and liberty. In Viviani's Cabinet M. Guesde served as minister without portfolio. Consult Hunter, Robert, 'Socialists at Work' (New York 1908) and Schapiro, J. S., 'The Drift in French Politics' (in *American Political Science Review,* Baltimore, August 1913).

GUEST, Edwin, English antiquarian and scholar: b. 1800; d. 1880. He was graduated at Gonville and Caius College, Cambridge, where he was appointed fellow in 1824 and chancellor in 1854. After practising law for a few years, he abandoned the bar for the more congenial pursuit of antiquarian and philological research. His 'History of English Rhythms' (2 vols. 1838) has great merit; and his studies of the antiquities of Great Britain, published posthumously by Dr. Stubbs under the title 'Origines Celticæ' (1883) brought together much original material. He became a fellow of the Royal Society and an honorary member of the Antiquarian Society.

GUESS, George. See SEQUOYAH.

GUEST, John, American naval commodore: b. Missouri, 1821; d. Portsmouth, 1879. He began his career in the navy at the age of 16, becoming captain in 1866. He served in the Mexican War, in the troubles with China (1854). When the Civil War broke out, he was placed in command of the *Owasco,* and later commanded the *Leigh* and *Itasca* at Fort Fisher. He became commodore in 1873, and was in charge of the Portsmouth Navy Yard until his death.

GUEST-BEES, a large genus (*Nomada*) of little bees of both Europe and America, which lay their eggs in the nests of burrowing bees of the genera *Andrena* and *Halictus,* where the young share the food gathered for the young of their hosts, and the adults live harmoniously together,— apparently a case of partnership rather than of parasitism. Compare CUCKOO-BEE.

GUEUX, Les, lā gā, or THE BEGGARS, the name assumed by the members of the nobility and their adherents who resisted the tyranny of Philip II of Spain over the Netherlands (1566). Led by Count Louis of Nassau and Count Hendrik of Brederode, they banded together under a compact called «The Compromise» to oppose in every way the enforcing of the decrees of the Council of Trent. They finally gained a hearing at the court of Margaret, Duchess of Parma, where the appellation «les gueux» was first applied to them. They took it up and assumed as insignia of their cause, the beggar's wallet and bowl. In spite of repeated suppression, the cause of the party persisted. In 1569, a new group of Gueux appeared. They were called «sea-beggars» because they had been granted privileges on the ocean by the Prince of Orange, who openly opposed the despotism of Spain. Under the leadership of daring Count William de la Marck; they conducted a series of piratical exploits, which culminated in the capture of Brill, 1 April 1572, and the capture of Flushing shortly afterward, and thus launched the War for Dutch Independence. Consult Kervyn de Lettenhove, 'Les hugenots et les gueux' (6 vols. Brussels 1882–85); Jurien de la Gravière, 'Les gueux de mer' (in *Revue des Deux Mondes,* Paris 1891–92).

GUEVARA, Antonio de, Spanish chronicler: b. Treceño, about 1490; d. 1545. His youthful years were passed at the court of Isabella; in 1528 he became a Franciscan and traveled abroad with Charles V. He was successively court preacher, historiographer, bishop of Guadix and bishop of Mondoñedo. In 1529 appeared his 'Reloj de principes,' purported to be an autobiography of Marcus Aurelius. It was soon translated into the principal languages of Europe and was long very popular. It is now difficult to understand or even assign a reason for this popularity, as the work is affected in style and full of moralizings. Other works from Guevara are 'Decada de los Césares' (1539) and 'Epistolas familiares' (1539–45); and 'Libro de los inventores del marear' (1539). Consult 'Biblioteca de autores españoles' (Vols. XIII and LXV, Madrid 1850–73) and Gálvez, 'Guevara in England' (Weimar 1910).

GUEVARA, gwā-vä'ra, **Luis Velez De,** Spanish lawyer and author: b. Écija, 1 Aug. 1579; d. Madrid, 10 Nov. 1644. He studied law at the University of Osuna and practised his profession for a time. At the court of Philip IV, he was a great favorite and was appointed chamberlain. He was a prolific author, the number of his plays amounting to some 400, only one-fifth of which have survived. Of these the best are the tragedies 'Reinar despues de morir,' 'Mas para el Rey que la sangre'; and the comedies 'La Luna de la Sierra' and 'El Diablo esta està en Cantillana.' His literary fame, however, rests on his 'El Diablo cojuelo' (1641), on which Le Sage based his 'Diable boiteux.' The works of Guevara were edited by Adolfo Bonilla y San Martin (Madrid 1910).

GUGGENHEIM, Benjamin, American capitalist: b. 1855; d. 1912. In 1875, he went to Denver where he superintended the mining interests of his father, and later, the smelting plant at Pueblo, Colorado. Returning east, he was placed in charge of the smelting works at Perth Amboy, N. J.; and in 1903 established the International Steam Pump Company at Milwaukee, becoming president in 1909. He was also one of the owners of the American Smelting and Refining Company. He lost his life in the *Titanic* disaster.

GUIANA, ge-ä'nä, the name often employed to designate that tract of country in South America bounded by the Atlantic Ocean, the

Amazon River and its branch, the Rio Negro, the Orinco River and the Cassiquiare. It lies between lat. 8° 40′ N. and lat. 3° 30′ S., between long. 50° and 68° W. The western districts belong to Venezuela; the southern and eastern districts to Brazil. The three European colonies, the British, Dutch and French Guianas (together forming «Guiana» in the restricted sense), extend from the seacoast to the frontiers of those republics.

The first settlements on the northern coast lay much farther toward the west, and exploration and colonization east of the Orinoco began when European adventurers continued in this new field their search for Eldorado. Spanish and Portuguese expeditions into Guiana during the 16th century were very numerous, but always disastrous. The English undertook its conquest, believing, in the words of Sir Walter Raleigh, «that whatever prince shall possess it, that prince shall be lord of more gold, and of a more beautiful empire, and of more cities and people, than either the king of Spain or the great Turk.» Capt. Laurens Keymis, sent by Raleigh in 1596 to explore the region, reported that «the like occasion seldom happeneth in many ages.» In the articles, Dabaiba and Eldorado, it is shown that the birthplace of the Eldorado myth was the region now known as Colombia, and that the time of its birth was near the beginning of the 16th century; but in the course of 100 years the site of Eldorado was transferred to central Guiana, and Schomburgk asserts that the possibility of its existence in that locality continued to occupy the imagination and attention of adventurers until the close of the 18th century. Humboldt was the first to prove that a lake «like unto Mare Caspium,» as Raleigh described it, no longer existed, and it was erased from the maps; Schomburgk identified the locality where it was sought with the small lake Amucu near an Indian village named Pirara. Raleigh led several armaments from England with the hope of conquering the golden capital. When these undertakings ended in disappointment, Captain Keymis committed suicide, and Raleigh «paid the forfeit of his illusions with his life upon the scaffold.» Dutch traders, who arrived about 1580, settled on the Pomeroon and Essequibo rivers; and after the establishment of the Dutch West India Company land on the Berbice River was granted to van Peere. The Pomeroon colony was abandoned owing to attacks by the English in 1666 and by French privateers. In 1740 English planters from the West Indies established themselves on the Essequibo, as a result of the «open door» policy adopted by the Dutch with respect to that region alone. Next, the overflow of immigration settled in the Demerara district; and in 1781 all three colonies, Essequibo, Demerara and Berbice, were taken by the British. Recaptured before the year was out by the French (who were then allies of the Netherlands), they were again taken by the British in 1796. The peace of Amiens restored the original status; but English troops interposed once more, and the colonies were ceded to Great Britain by the treaties of 1814–15. They were united in 1831, forming British Guiana.

In the region east of Berbice, a few English people attempted to form a colony at the village of Paramaribo (1626), but abandoned the project. Ten years afterward the French invested Paramaribo, but relinquished it, proceeded to Cayenne, and there founded what is now known as French Guiana. In 1652 a body of English settlers again arrived at the Coma River, and succeeded in establishing themselves. This colony was granted in 1662 by Charles II, to Lord Willoughby, who changed the name Coma River into Surryham, in honor of the Earl of Surrey. Hence we have «Surinam,» the name often used instead of Dutch Guiana. The British crown bought the colony from the heirs of Lord Willoughby, but it passed into the hands of the Dutch about the time when Holland gave up the attempt to keep New Amsterdam, now New York. The statement often repeated, that Surinam was «exchanged» for New Amsterdam is incorrect.

1. British Guiana is situated approximately between lat. 1° and 8° 40′ N. It is bonded on the north and northeast by the Atlantic Ocean, on the east by Dutch Guiana, on the south by Brazil, and on the west by Brazil and Venezuela. Its area is 89,480 square miles. The old settlements of Essequibo, Berbice and Demerara form counties with the same names. Of these; Demerara contains the capital of the colony (see Georgetown); Essequibo, the town of Bartica, the point of departure for miners going to the gold-fields; and the capital of Berbice County is New Amsterdam. One of the chief points on the new boundary line with Venezuela, Mount Roraima, is an immense sandstone mass rising with perpendicular sides 2,000 feet above the slopes (themselves 6,000 feet above sea-level) which form its base. Some of the neighboring mountains resemble it in form, but are less imposing. Midway between this group and the Atlantic coast is the Imataca range, extending east-southeast to the confluence of the Cuyuni and Essequibo. The latter with its tributaries drains nearly the whole interior of the colony; the Demerara, though much smaller, is more important, because it flows through the region which has become the centre of population; the Corentyne is the boundary between British and Dutch Guiana.

Geology and Mineral Resources.— The original sea beach is found far inland, where it now appears as long stretches of white sand reefs, the sand being derived from a barrier of primary, volcanic and metamorphic rocks, which impedes the navigation of the rivers. The strip between this barrier and the ocean front — composed of layers of soft mud, clay, sand, broken shells and decomposed vegetable matter — is really an enormous mud-flat, about 100 feet in depth, and covered with a rich, heavy loam, and in places, with a kind of peat called pegass. The whole interior of the country, between the agricultural coast-strip and the range culminating in Roraima, is an auriferous region. The gold is commonly found in combination with silver. Quartz-mines have been worked in upper Demerara, but placer-mines in the beds of former streams or the channels of existing ones are more usual. Other mineral products are iron, sapphires, diamonds, mercury, garnets, antimony and plumbago. A sandstone formation characterizes the southwest, from Mount Roraima to the Potaro and Essequibo rivers, thence extending eastward across the Demerara, Berbice and Corentyne. The sandstone is interbedded with volcanic rocks. In many parts of the colony there are red, yellow and blue clays; and fine white clay, suitable for the manufacture of porcelain, is also found.

Soil and Climate.— The surface of the coast alluvium is so fertile that alternation of crops is not required; it is, however, very heavy and hard to cultivate. The thermometer ranges generally from 76° to 86° F., with little difference in this respect between day and night. The rainfall, in some years 130 inches, in others is not more than 70 inches. The year is divided into two rainy seasons (November-February and May-July), and two dry seasons. Neither destructive earthquakes nor hurricanes occur. There has been only one serious outbreak of yellow fever during 50 years. Death rate of the colony about 35 per 1,000.

Flora and Fauna.— Characteristic forest products are exceedingly hard and heavy woods. The greenheart, mora and wallaba are valuable for building; the simaruba, letter-wood and crabwood, for making furniture, etc. Vegetation in Guiana is remarkable on account of the altitude of the trees and the great size of leaves and flowers. The gigantic water-lily, Victoria Regia, is very common. Some of the orchids form large masses, with flower-stems 12 feet high. Common mammals are sloths, deer, ant-eaters, tapirs, armadillos, peccaries, jaguars, cavies and ring-tail monkeys. Monkeys belong to two families which are entirely confined to this region, and bats develop here their most extraordinary specializations. In some parts of the forest vampires are «ready to suck the foot or even the cheek of the unwary traveler.» The manatee (*vulgo* «mermaid» or «water-mamma»), inhabiting some of the large rivers, and coming to the surface at intervals to breathe or to graze on the plants which line the banks, owes its popular designations to the circumstance that it suckles its young at the breast. The representative families of birds are, with few exceptions, peculiar to this region, the list of such birds including greenlets, tanagers, hang-nests, sugarbirds, tree-creepers, manakins and cotingas. Alligators and boa constrictors both attain to great size in this region; iguanas and smaller kinds of lizards are numerous. Among the insects, the variety of genera and species can, it is thought, scarcely be equaled in any other part of the world. Uncommon brilliance of coloring is characteristic of both the birds and the insects.

Agriculture.—About 169,520 acres are under cultivation, or, say, one acre out of every 50 available for the purpose, and of this amount 73,100 acres are in sugar plantations, and 47,050 acres under rice.

Commerce, Shipping, Railways, etc.— The chief imports (1914) were flour and textiles; chief exports, sugar, raw gold, rum, rice, balata and diamonds. Registered vessels numbered 59, comprising 41 sailing vessels and 18 steamers. Total tonnage entered and cleared, in 1914 was 1,039,582. There are 97½ miles of railways, 315 or 316 miles of good roads, and a limited number of miles of the large canals used for navigation. Smaller canals, to carry off superfluous water from the plantations, intersect each other in every direction. The heavy rainfall and the flatness of the coast region oblige the planters to maintain these canals to provide drainage, and by means of the larger draining trenches the sugar canes are taken to the mills in punts. There are 73 post offices, 46 telegraph offices, nine traveling post offices, about 559 miles of telegraphs and cables, and telephone services in Georgetown and New Amsterdam.

Money and Banking.— British gold and silver are used. There are 25 saving banks, with 21,266 depositors, and two banks with note circulation.

Government.— The governor is assisted in executive and administrative matters by an advisory council, composed of three colonists and three officials, all appointed by the king of England; in legislative matters by the Court of Policy (seven officials beside the governor, and eight elective members, chosen from inhabitants by constituency of voters qualified by income or property), and a combined court containing, beside the above, six financial representatives. The governor has a casting vote, and can decide any question against the votes of the representative members. The colonists are in the majority, however, in the combined court, which votes the taxes and public expenditures.

Finances.— Total revenue for the year 1914–15 was £586,598, derived mainly from customs, licenses, duty on rum, and royalty on gold. Public expenditures in the same year amounted to £622,025.

Population, Schools and Judiciary.— The census of 1891 showed: Negroes, 115,588; East Indians (Hindu coolies), 105,465; aboriginal Indians, about 17,463; Portuguese from Madeira, 12,166; whites of other nationalities, 4,558; Chinese, 3,433; mixed races, etc., 29,376. The total number of inhabitants 1 Jan. 1915 was about 310,000. In 1914–15 the schools sharing in the government's annual grant (£31,871) were 228 in number. There are three judges, and, in the several districts, a number of magistrates. The criminal law is based on that of England; in civil cases the Roman-Dutch law is applied, with certain modifications.

History (including the boundary dispute with Venezuela).— Prohibition of the slave trade checked the agricultural development of the colony, and emancipation of the slaves (1838) ruined many planters, the freed negroes demanding higher wages than the planters could afford to pay. This crisis led to the introduction of large numbers of laborers from Madeira, the East Indies, China, and Malta. Immigrants of a different class began to arrive about 1886 in consequence of the rediscovery of gold; but serious difficulties arose precisely on account of the enhancement in the value of the auriferous regions, some of the most promising of which were located in the territory west of the Essequibo claimed by both Venezuela and Great Britain. The inland limits of the Spanish (afterward Venezuelan), the British, the Dutch, the French, and the Portuguese (afterward Brazilian) Guianas were undetermined. In 1841 Schomburgk surveyed the boundary line of British Guiana for the British government, and made two maps; the second or revised map placing the boundary with Venezuela much farther toward the west than the first. Subsequently Venezuela and Great Britain agreed not to encroach upon the territory in dispute, pending a settlement of the boundary question, but both countries offended against the spirit of this compact. The proposal for arbitration in 1887 was met by England's prompt refusal to admit any doubt as to her title to the lands east of the revised Schomburgk line, and, a little later, by the establishment of British posts, and the declaration that the region drained by the Barima River was hers by right. It is necessary to bear in mind that if England had accepted the views of Venezuela and Brazil as to the boundaries of British Guiana, that colony would have disappeared from the map. Brazil claimed all but about 12,000 square miles; Venezuela nearly the whole of the old Essequibo colony, the Pomeroon and the unsettled interior districts. When President Cleveland, in 1895, called to the attention of the British government the bearing of the Monroe doctrine upon the question at issue, his suggestion was at first not accepted. His message to Congress went much farther. It advised Congress that a commission should be appointed for the determination of the true boundary, and declared in effect that any attempt to extend British territory beyond the true boundary should be resisted by the United States, by force, if necessary. It was a threat of war. Pursuant to the act of Congress 21 Dec. 1895, a commission was appointed 1 Jan. 1896. But before their report was submitted a treaty providing for the reference of the matter to a tribunal of arbitration had been signed at Washington (2 Feb. 1897). Arbitrators were Chief Justice Fuller and Justice Brewer of United States Supreme Court; Lord Herschell (and, after his death, Lord Russell of Killowen), and Justice Sir R. H. Collins; and as president, Professor Martens. The tribunal met at Paris in 1899. The award, given 3 October, determined the boundary nearly in correspondence with the second or revised Schomburgk line, assigning to Great Britain a region about 60,000 square miles in area which Venezuela had claimed. On the other hand, Point Barima, at the principal mouth of the Orinoco, and certain gold-fields near the headwaters of the Cuyuni, were awarded to Venezuela. The territory of British Guiana, thus defined, extends along the seacoast to Point Playa, and includes the whole valley of the Barima and that of the Cuyuni east of the Wenamu — the larger part, though probably not the best part, of the mining region.

2. Dutch Guiana or Surinam is bounded on the north by the Atlantic Ocean, on the east by French Guiana, on the south by Brazil, and on the west by British Guiana. It extends from lat. 2° to 6° N., and from long. 53° 50′ to 58° 20′ W. Area 46,072 square miles. The political divisions are districts, 13 in number, and communes; the capital, Paramaribo, has (1 Jan. 1915) 35,530 inhabitants. Chief products are cacao, sugar, coffee, bananas, rice, maize, rum, molasses, balata, and gold (output 918,595 grammes in 1914). The mining experience of this colony resembles that of British Guiana: gold has been sought hitherto in beds of streams, etc., but is now being taken also from mines which require crushing machinery. Imports regularly exceeded in value the colony's exports during many years, but from 1910–14, inclusive, the balance of trade has been as regularly favorable. Executive authority is vested in a governor. The representative assembly, called the Colonial States, is composed of members chosen for six years by a limited number of electors. The council consists of five members, including the governor himself as president, and represents the sovereign. The revenues of the colony fall short of the expenditures. The military force is about as follows: Garrison, 20 officers and 351 men; militia, 27 officers and 411 men; and civic guard, 59 officers and 1,061 men. There are a few guard ships and vessels of the royal navy. The number of inhabitants 1 Jan. 1915 was 85,536, beside the forest-dwellers. Educational institutions are: A normal school; schools maintained by the Moravian Brethren and the Roman Catholics; private schools, with 4,822 pupils; and public schools, with 3,594 pupils. The judicial system comprises a court of justice (all the officers appointed by the queen), two circuit, and three cantonal courts. Slavery was abolished 1 July 1863, but the authorities imposed the conditions that for 10 years the emancipated negroes should remain upon the plantations of the districts in which they had formerly lived, and should perform the same kind of work for wages that they had been accustomed to while in bondage. After 1 July 1873, the importation of laborers to replace the freedmen became a matter of life and death in Surinam as in the neighboring colonies, for agriculture was almost ruined. Interesting in this connection are the following figures: At the beginning of 1915 there were among the inhabitants 16,995 Hindus, 10,847 Mohammedans, 9,571 members of the Reformed and Lutheran churches, 25,862 Moravian Brethren, 18,178 Roman Catholics and 837 Jews.

3. French Guiana, lying between the Atlantic Ocean, Brazil, and Dutch Guiana, has an area of about 32,000 square miles. Besides Cayenne, capital of the colony, and its only port (population, according to the latest census, 13,527), there are 14 communes. Mineral productions are gold (105,600 ounces in 1914), silver, marble, phosphates, and iron. Agricultural productions are varied (including sugarcane, cocoa, coffee, rice, indigo, tobacco, maize, and manioc), but laborers are few, and the area under cultivation is small, and the total value of the crops insignificant. The value of exports is less than that of the imports. For example, in 1913, the last normal year before the European War, the imports were valued at 10,775,916 francs and the exports at 10,215,129 francs. Colonial interests are entrusted to a governor and privy council of five members, and one deputy represents the colony in the French Parliament. There is also an assembly called the Council-General, composed of 16 members. Revenue and expenditures for 1914 were each estimated at 3,838,836 francs; but the cost of maintaining the penal establishment is borne by the French republic. Between 150 and 160 French soldiers are kept in the colony. The total population, including convicts and Indians, was given as 32,908 in 1901. It had increased to 50,000, approximately, in 1916. Cayenne has a superior court, court of first instance, and two justices of the peace; a college, a library, and a museum; in the entire colony there are 31 primary and seven congregational schools.

From the first, the French undertaking in Guiana has been unsuccessful. On 11 Dec. 1653, the survivors of the original colony abandoned the fort and sailed away, after suffering from hunger and disease. A new company formed for the colonization of Cayenne in 1663 was scarcely able to hold its own against hostile neighbors in Brazil. The deportation of political prisoners to Guiana at the end of the 18th century completed the ruin which Portuguese attacks had begun; for the exiles ascribed the death of their companions to the climate; and French Guiana was completely discredited in the eyes of the world. In January 1809, the colony surrendered to the Portuguese and English. It was restored to France by the treaties of 1814–15. Since 1855 it has been used as a penal settlement. In 1902 the number of convicts in residence there was 10,075, including 240 women. At the beginning of 1915 the number was 8,693. The boundaries with Brazil were determined 1 Dec. 1900, by the Swiss court of arbitration.

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MARRION WILCOX.

GUIB, a bush antelope of South East Africa (*Tragelaphus scriptus*). It is about the size of a goat and varies greatly in color. From the special dark markings which are common to other types also it is called "harnessed buck." It hides in the dense undergrowth of the region from Abyssinia to near the Cape, usually adjacent to the great streams.

GUIBERT OF NOGENT, gē'bėr' ŏv nō-zhän', French ecclesiastic and historian: b. Clermont-en-Beauvoisis, 1053; d. about 1124. He studied theology under Anselm of Bec (Saint Anselm) and became chief abbot at Notre Dame de Nogent in 1104. His works include a history of the first crusade 'Gesta dei per Francos' (1110); an autobiography 'De vita sua sive monodiarum,' which is valuable chiefly for its local color; a criticism of saints and relic worship, 'De pignoribus sanctorum'; and numerous minor comments on books of the Bible, homilies, etc. His writings were first edited by D'Archery (1 vol., Paris 1651), and were republished in Migne, 'Patrologia Latina' (Vols. clvi and clxxxiv). Consult Monod, B., 'Le moine Guibert et son temps' (Paris 1905); and Bourgin, C., 'Guibert de Nogent, histoire de sa vie' (Paris 1907).

GUIBERT, or WIBERT, Antipope of Ravenna: b. near Clermont, about 1025; d. Civita Castellana, September 1100. He was appointed chancellor and imperial vicar in Italy, in which capacity he presided over the synod at Basel (1061). In 1073 he became Archbishop of Vienna and attached himself to the imperial party. His differences with Gregory VII, caused the excommunication of Guibert in 1078. But the emperor, refusing to accept the decisions of Gregory, had him deposed and caused Guibert to be elected Pope. In 1084 the city of Rome was conquered by the imperial forces and Guibert was enthroned in the Lateran as Clement III. As long as the protection of the imperial party maintained, he held sway at Rome, against the succeeding rival popes Victor III, and Urban II, until he was forced to evacuate Rome by the crusaders in 1097. After futile attempts to regain his possessions and his prestige, he was finally conquered by Paschal II. Consult Gregorovius, F., 'Rome in the Middle Ages' (Vol. IV, Eng. trans. by G. W. Hamilton, London 1900–02); Köhncke, O., 'Wibert von Ravenna' (Leipzig 1888).

GUIBORD CASE. The Institut Canadien, founded in Montreal in 1844 with literary and scientific objects, brought itself under the ban of Bishop Bourget (q.v.) on account of the alleged irreligious tendencies of certain of the books in its library. In particular, the society's 'Year Book' for 1868 was condemned by the bishop, and his sentence was ratified by the Congregation of the Index. The bishop warned his diocesans that any Roman Catholic who should keep the condemned pamphlet and continue his connection with the institute would be refused the sacrament of the Church even at the moment of death. Joseph Guibord, a foreman printer of Montreal and a prominent member of the institute, died on 18 Nov. 1869, without having made such submission, his corpse was denied burial in that part of the cemetery of Notre Dame des Neiges set apart for burials made with the rites of the Church, and interment in the first instance took place in the Protestant cemetery. A lengthy lawsuit to enforce Guibord's rights of sepulture then ensued which became a *cause célèbre.* The case passed from court to court, and finally came before the Queen's Privy Council in London, when judgment was given, in November 1874, that the corpse must be buried, without a funeral mass, in consecrated ground. The first attempt to remove the body from the Protestant cemetery to Notre Dame des Neiges was frustrated by the threatening demeanor of a mob, and final interment in that cemetery was made 16 Nov. 1875, exactly six years after Guibord's death.

GUICCIARDINI, gwē-chär-dē'nē, **Francesco,** Italian historian: b. Florence, 6 March 1483; d. there, 23 May 1540. He studied at Padua and became an advocate and professor of law at Florence. In 1512 he was appointed Ambassador to the court of Ferdinand the Catholic of Spain. At a later period he was invited by Leo X, to his court and entrusted with the government of Modena and Reggio. This office he discharged also under Adrian VI, to the general satisfaction; and afterward, when Clement VII, (de' Medici) ascended the papal chair, Guicciardini was sent as lieutenant of the Pope to Romagna. He contributed here to the public good by restoring civil order, constructing roads, erecting public buildings and founding useful institutions. Having been appointed lieutenant-general of the Pope, he, in 1521, defended Parma when besieged by the French. In 1534 he began his great work 'Istoria d'Italia' (1561–64) extending from 1490 to 1534. In 1537 he contributed greatly to the elevation of Cosmo de Medici to the office of grand-duke, but when later he attempted to impose constitutional limitations upon the grand-ducal power, he lost his influence. The 'History' was translated into English by Goddard and the translation published between 1753 and 1761. The reader of Guicciardini is sometimes offended by a want of method and his statements cannot always be depended on as derived from the best sources.

GUICCIARDINI, Francesco, COUNT, Italian statesman: b. 1851; d. 1915. After studying at the University of Pisa, he entered politics in 1882 as a member of the Lower House. Two years later he was appointed General Secretary for Agriculture, Commerce and Trade. In Rudini's Cabinet (1896–97) he held the office of Minister of Agriculture; from 1909–10 he was Minister of Foreign Affairs in Sonnino's Cabinet. He was also a member of the House of Deputies for a number of years and Vice-President of that body several times.

GUICCIOLI, gwē-chō'lē, **Teresa,** COUNTESS: b. 1801; d. 1873. She was the daughter of Count Gamba of Ravenna and was married to Count Guiccioli when she was 16 and he 60 years of age. Later she married the Marquis de Boissy (1851). From 1819–22 she was an intimate acquaintance of Lord Byron and wrote 'Lord Byron, jugé par les témoins de sa vie' (1868, Eng. trans. 1869).

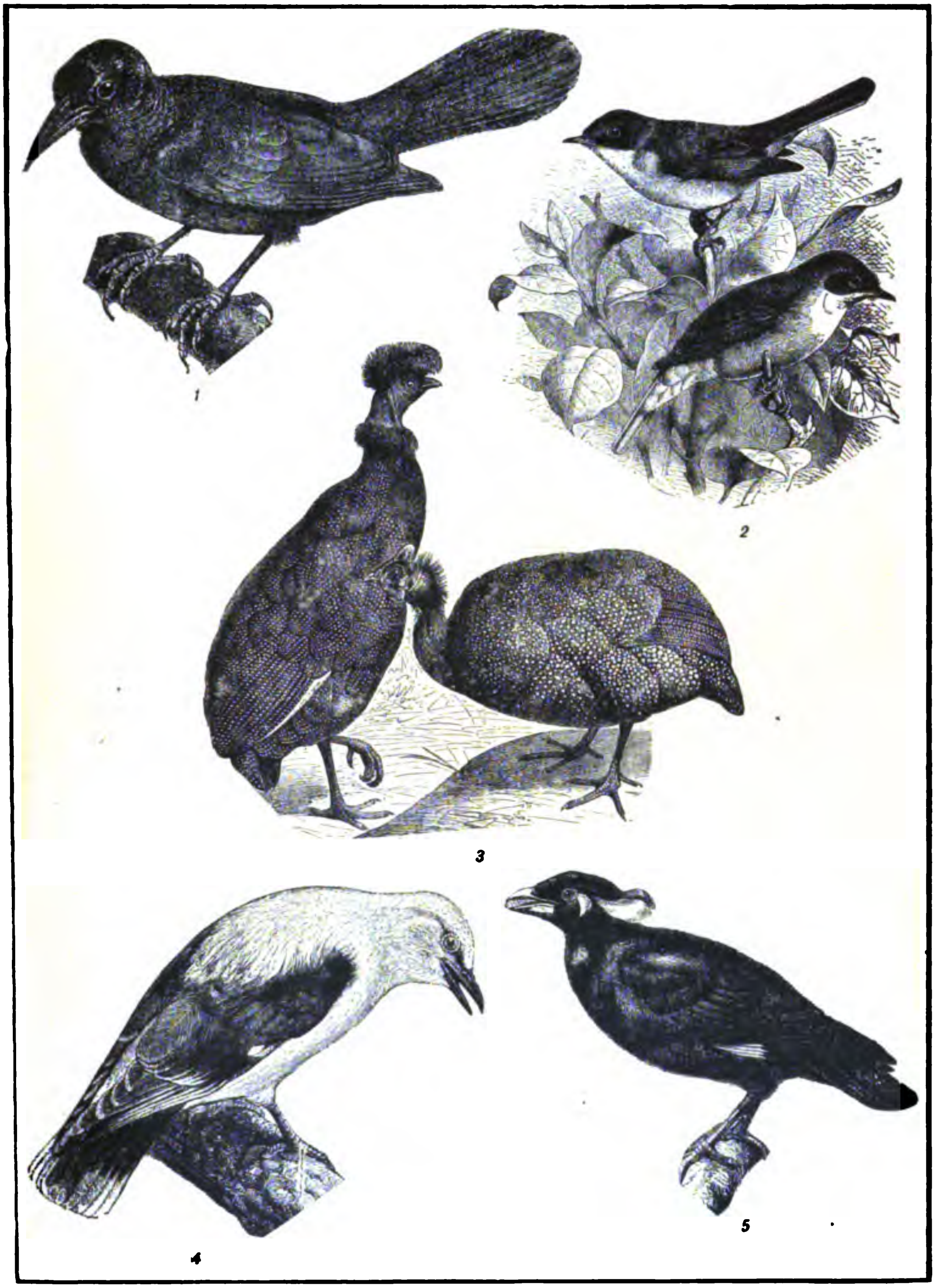
GUICHARD, gē'shär', **Karl Gottlieb,** or QUINTUS ICILIUS, German military officer and historian: b. Magdeburg, 1724; d. Potsdam, 1775. He received training for the Church, but abandoned it for the more congenial pursuit of historical study. He finally enlisted in the service of the Dutch army and fought there for a year. In 1757 he published his first work on ancient history of military affairs under the title 'Mémoires militaires sur les Grecs et les Romains.' On his return to his native country, he fought in the army of Duke Ferdinand of Brunswick, who later recommended him to Frederick the Great. The king being pleased with Guichard's talents, retained him in his service. The story concerning the conferring of the official name of «Quintus Icilius» upon Guichard is told as follows: In the course of conversation, the king, referring to the battle of Pharsalus, mentioned the part taken by a centurion named Quintus Icilius. Guichard corrected him by producing the text of Polybius which confirmed the fact that the name of the man in question was Quintus *Cæcilius*. The king then answered, «Then your name shall be Quintus Icilius.» And it was by this name that Guichard henceforth became known in the Prussian army. He rose to the rank of major, lieutenant-colonel and finally colonel 1773. In that year he published his 'Mémoires critiques et historiques sur plusieurs points d'antiquités militaires.' Consult Carlyle, T., 'Frederick the Great' (London 1858–65).

GUIDE-BIRDS, or **HONEY-GUIDES,** certain small, mainly black and yellow birds, allied to the barbets and constituting a genus inhabiting the tropical regions of the Old World, which have the curious habit of attracting the attention of men and of honey-loving quadrupeds to bees' nests, profiting by the disturbance which follows. They are fond of bees, grubs and honey, but cannot often get them without assistance; sometimes, also, they show equal zeal in leading a person to a snake, leopard or something else which has attracted their notice. Although the genus is known in India and Malaya, it is in South Africa that its traits are most noticeable and the books of travelers and explorers there abound in accounts of its guiding habits. Sir John Kirk contributed the following exact description of the work of *Indicator minor* to the 'Ibis' (1864):

«The honey-guide is found in forests, and often far from water, even during the dry season. On observing a man it comes fluttering from branch to branch in the neighboring trees, calling attention. If this be responded to as the natives do by whistling and starting to their feet, the bird will go in a certain direction and remain at a little distance, hopping from one tree to another. On being followed it goes further; and so it will guide the way to a nest of bees. When this is reached, it flies about, but no longer guides; and then some knowledge is needed to discover the nest, even when pointed out to within a few trees. I have known this bird, if the man after taking up the direction for a little then turns away, to come back and offer to point out another nest in a different part. But if it does not know of two nests, it will remain behind. The difficulty is, that it will point to tame bees in a bark-hive as readily as to those in the forest. This is natural, as the bee is the same; the bark-hive, 'musinga' as it is named, being simply fastened up in a tree and left for the bees to come to. The object the bird has in view is clearly the young bees. It will guide to nests having no honey and seems equally delighted if the comb containing the grub be torn out when it is seen picking at it.»

GUIDES, in military affairs, persons drawn from the country in which an army is encamped to lead troops in night operations or through a strange country; also non-commissioned officers or other enlisted men who take positions to mark the pivots, marches, formations and alignments in modern tactics. When civilians are drawn from a hostile population, and have probably only a pecuniary interest in serving well, their conduct is always watched with the utmost jealousy, death being the punishment for the least lack of trustworthiness. The absence of large-scale maps, previous to 1800, made the employment of guides almost essential and guide officers were specially trained by most of the armies of Europe. With the advent of adequate surveys and large-scale military maps the need for guides disappeared in great part and they are now seldom heard of.

GUIDI, gwē'dē, **Carlo Alessandro,** Italian poet: b. Pavia, 1650; d. Frascati, 1712. He played an important part in the founding of the «L'Arcadia» Academy at Rome, and did much to restore the vigor and dignity of Italian lyric poetry. A certain restraint and conventionality is characteristic of his work. His chief patrons were Rancuccio II, duke of Parma, who was the first to appreciate his poems; and Christina,



1 Guide-bird (Indicator sparrmanni)
2 Garden Warblers (Sylvia curruca and S. rufa)
3 Guinea Hens (Numida cristata and N. meleagris)
4 European Golden Oriole (Oriolus galbula)
5 Grakle (Eulabes religiosa)

queen of Sweden, for whom he wrote the pastoral drama 'Endymion' (1685). Other works are the tragedy 'Amalasunta in Italy,' the drama 'Daphne,' and the poetical version of the six homilies of Pope Clement XI. His rhymes were published at Parma in 1681, the best of the collection being the 'Alla Fortuna,' a lyric of singular charm. Consult Capsoni, G., 'Alessandro Guidi' (Pavia 1897).

GUIDI, Ignazio, Italian scholar: b. Rome, 1844. In 1878 he was appointed professor of Semitic languages at the University of Rome, and is known principally for his editions and translations of Semitic fragments and texts, in Arabic, Coptic, Ethiopic and Amharic languages. His researches led him to the conclusion that the Semitic peoples came originally from the lower Euphrates.

GUIDICCIONI, gwē-dē-chō'nē, **Giovanni,** Italian poet and ecclesiastic: b. Lucca, 1480; d. Macerata, 1541. He became bishop of Fossombrone, and was later elected president of Romagna. He wrote poems in dignified and elegant and simple style, patriotism and love being the central themes. His complete works were published in 1718; and again at Genoa (1749); Bergamo (1753) and Florence (1878). In 1865 his 'Lettere inedite' appeared. Consult Minutoli, C., 'Opere di Monsignor G. Guidiccioni' (Florence 1867).

GUIDO D'AREZZO, gwē'dō dä-rĕts'ō, or **GUIDO ARETINO.** See Aretino, Guido.

GUIDO DELLE COLONNE, kōl-ō'nē, Italian poet who lived in the 13th century. His principal work was a 'Historia Trojana,' based on Dictys and Dares, which was translated into English, French and Italian and proved to be a great source for plots for the literature of those countries. He was also the author of several romantic poems in Italian. The origin of Chaucers tale of 'Troilus and Cressida' is found in Guido's 'Historia.'

GUIDO OF LUSIGNAN. See Guy of Lusignan.

GUIDO RENI. See Reni, Guido.

GUIDO OF SIENA, the supposed name of an Italian painter, whose existence is a subject of great controversy in Italian art. Nothing is known of him except from an inscription on the picture of the 'Virgin and Child Enthroned' in the church of Saint Domenico at Siena which is signed "Guido de Senis" with the date "1221." If this is authentic, then it is to this Guido, and not to Cimabue that the distinction of having revived the painter's art belongs. According to Crowe and Cavalcaselle, however, the date should be read "1281," since the superiority of execution of the heads indicates a more highly developed art than that produced in 1221. Douglas's theory is that the heads have been repainted at a later date. Milanesi attributes the painting to Guido Graziani. Other pictures assigned to him are the 'Virgin and Child' at the Academy at Siena and a 'Madonna' at the church of Saint Bernardino at Siena. Consult Milanesi, 'Della vera età di Guido' (Siena 1859); Crowe and Cavalcaselle, 'History of Painting in Italy' (Vol. I, London 1893).

GUIDON, gī'don, a small flag or pennon for guiding troops, especially a swallow-tailed flag, such as is carried by a regiment of cavalry or mounted artillery. In the United States cavalry the regimental guidon is half red and half white, dividing at the fork. The red above has "U. S." in white. The white is below and has the letter of the company in red. The fly is three feet five inches to the end of the tail; the head is 27 inches. The lance is nine feet long including spear and ferrule. The engineer's corps has a triangular, scarlet guidon.

GUIENNE, gē-ĕn, or **GUYENNE,** ancient Aquitania (q.v.), a former southwestern province of France, now divided into the departments of Gironde, Lot, Lot-et-Garonne, Dordogne, Aveyron and part of Landes and of Tarn-et-Garonne The capital was Bordeaux.

GUIEYESSE, gē-ās', **Pierre Paul,** French engineer and Egyptologist: b. Lorient, 1841; d. 1914. He studied at Lorient and at the École Polytechnique, and began his career in the marine hydrographical engineering corps. In 1870 he became a chevalier of the Legion of Honor, and four years later began to instruct in mechanics at the École Polytechnique, in which capacity he served for 19 years. He also was a profound student of Egyptology, on which he lectured at the Collège de France 1886–87. From 1890–1910 he was a member of the Chamber of Deputies; Colonial Minister (1895–96) and reprepresented New Caledonia in the Superior Council of the colonies (1903–06).

GUIGNARD, gi-nyär', **Jean Louis Léon,** French botanist: b. Mont-sous-Vaudrey (Jura), 13 April 1853. He is director of the Higher School of Pharmacy and member of the Institute, Paris; member of the council of higher education and director of the Botanical Gardens of Lyon. He has written extensively on botany and other scientific subjects; but most of his work has appeared in scientific journals.

GUIGNES, gēn, **Joseph de,** French Oriental scholar: b. Pontoise, 19 Oct. 1721; d. Paris, 1800. He was admitted to the Royal Society of London in 1752, and to the French Academy of Inscriptions two years later. In 1758 he succeeded to the chair of Syriac at the Collège de France His fame rests on his 'L'Histoire générale des Huns, Turcs, Mongols, et autres Tartares occidentaux' (1756–58).

GUIJA, gwē'hä, a lake about 25 miles long in the republics of Guatemala and San Salvador, in Central America. It is in a volcanic region and contains two small volcanic islands.

GUIKOWAR, gīk'wär, **GAIKOWAR, GAEKWAR,** etc., the native title of the Mahratta prince, ruler of the province of Baroda (q.v.) in British India. The quikowar was of great importance in the 18th and 19th centuries, being hereditary commander of the Mahratta army. The military organization was so strong that about 1750 they were the ruling power in western and central India. (See Mahrattas and India). For many years the Guikowar of Baroda was feared by the people of the smaller states, and his troops boasted that they had watered their horses in every river in India. The great Guikowars were Pilaji (1721), Damaji (1732), Anand Rao (1800), Sayaji Rao (1819). The ruling Guikowar in 1874 was tried for attempting to poison the British resident and was deposed. After 1800 British influences increased and in 1802 the native Guikowar was deprived of most of his authority though the title still remains, and Sayajo Rao (b. 1862), the present potentate under the style of Maharaja Guikowar of Baroda, made a tour of the United States in 1906.

GUILBERT, gĭl'bār', **Yvette,** Parisian singer: b. Paris, 1869. She trained for the stage under Landrol and made her début at Les Bouffes de Nord. As a singer of comic songs, she was most popular at the leading café chantants and theatres of Paris. She toured England and Germany and visited the United States in 1895–96; again in the following year, and also in 1917–18. She sang ballads of the Latin Quartier at first, but later her repetoire consisted of historical songs and ballads which she rendered in costume in the dramatic style, impersonating the various characters with great charm. In 1895 she married Dr. M. Schiller. She is also the author of two novels, ‘La vedette’ and ‘Les demi-vieilles’ (1902).

GUILD, Curtis, American journalist: b. Boston, Mass., 1827; d. 1911. After several years reporting for the Boston *Journal,* he became one of the owners of the Boston *Traveller* and in 1859 established the Boston *Daily Commercial Bulletin,* of which he became the editor. He published ‘Over the Ocean’ (1867); ‘Aboard Again’ (1873); ‘Britons and Muscovites’ (1888); ‘A Chat About Celebrities’; ‘From Sunrise to Sunset’ (verse).

GUILD, Curtis, Jr., American journalist and politician: b. Boston, Mass., 2 Feb. 1860; d. 6 April 1915. He was graduated at Harvard in 1881 as class orator, and entered the employ of the *Commercial Bulletin* of Boston, conducted by his father, Curtis Guild (q.v.). He interested himself at once in local politics, was Republican delegate-at-large to the Saint Louis convention in 1896; and active in securing the gold plank in the national platform. In the following campaign he made a political tour of 10 States. He was appointed brigadier-general of Massachusetts militia and inspector-general of rifle practice by Governor Roger Wolcott. At the outbreak of the Spanish War he was appointed lieutenant-colonel and inspector-general, United States Army, serving in the Seventh Army corps under Gen. Fitzhugh Lee. In 1900 he accompanied Theodore Roosevelt on a tour of political speaking through the West. In 1902 he became sole owner of the *Commercial Bulletin.* He was elected, 4 Nov. 1902, lieutenant-governor of Massachusetts, with John L. Bates, governor-elect; and was inaugurated 10 Jan. 1903. In 1905, 1906 and 1907 he was elected governor. President Taft appointed him Special Ambassador to the Mexican Centennial in 1910, and in the same year he was appointed Ambassador to Russia. He resigned the latter post in 1913.

GUILD, Reuben Aldridge, American librarian and author: b. West Dedham, Mass., 4 May 1822; d. 1899. His published works include ‘Biographical Introduction to the Writings of Roger Williams’ (1866); ‘History of Brown University with Illustrative Documents’ (1867); ‘Chaplain Smith and the Baptists’ (1885).

GUILD, a fraternity, society or company, formerly active in commerce and mechanics. Guilds played an important part in public affairs in the Middle Ages. The Romans had various mechanical fraternities, but these seem to have been merely religious and political societies; while the associations of workmen in the arsenals that existed under the empire were regular hereditary castes, enjoying certain privileges and bound to certain duties. In Italy, the cradle of the class of free citizens in the Middle Ages, and particularly in the Lombard cities, those connecting links between the ancient and modern civilization, some remains of these Roman institutions, or recollections of them, probably contributed to revive the guilds, which naturally presented themselves as an excellent means of supporting the citizens against the nobility by uniting them into powerful bodies. It is certain that small societies existed as early as the 8th century, which appear later to have been in the possession of important political privileges. In the 9th century they appeared in England, and in time the kings granted the members certain privileges and immunities. When the advantages of these associations became known and felt they rapidly increased; and in the struggles of the citizens and the nobility the principal resistance against the latter was made by the corporations. As soon as the citizens acquired an influence on the administration the guilds became the basis of the municipal constitutions, and everyone who wished to participate in the municipal government was obliged to become the member of a guild. Guilds in Germany possessed no political importance before the 13th century. At this time they acquired the right of bearing arms for the defense of their own interests, and when a struggle arose between them and the citizens belonging to ancient families the guilds were victorious and became so powerful that even persons of “free occupations” joined these associations as the allodial possessors of land sometimes placed themselves under feudal lords. The by-laws of the German guilds contained regulations as to the training of apprentices, the practice of one's trade in different towns as a journeyman and the requirements of a master. Thus was laid the foundation of that excellent workmanship that characterized the Germans in later years. This was the real birth of what is now termed trades unionism. At an early period these workmen's associations met with opposition, but the opposition was not at first directed against them on account of the obstacles they threw in the way of commercial intercourse, and the other evil consequences of their monopoly, but simply on account of their political influence. In the 18th century several edicts were made in Germany against the abuses of the guilds, and at different dates in the 19th century freedom was granted in most of the states of Germany to all to practise any trade without being admitted into a guild. In Austria this was done in 1860, and in 1868 it was done for all the states of the North German Confederation.

In Great Britain the societies of mechanics were important principally in a political respect, on account of their connection with the democratic element of the constitution. These societies originated at the time of the development of the importance of the cities. In the towns where they long existed they had an important influence in the election of representatives and in the municipal administration. These guilds, in England, had no legal right to prevent any man from exercising what trade he pleased. The only restriction on the exercise of trades was the statute of Elizabeth, requiring seven years' apprenticeship. The guilds of the city of London (among the oldest of which are the weavers, founded in 1164; the parish clerks, in 1232; the saddlers, in 1280; the fishmongers, in 1284; the goldsmiths, in 1327; the skinners, in 1327; and the grocers, in 1345) are still very important corporations, still continuing to fulfil the chief object for which they were founded — that of giving relief to poor and destitute members, and also having in many cases the management of vast funds bequeathed for benevolent purposes by persons who selected one or other of the guilds as trustees. Sometimes these funds are bequeathed for specific purposes, which the guilds, as trustees, are of course bound to carry out; but in other cases, where they are available for general purposes, the guilds have usually shown great discretion in the manner in which they have employed them. Besides the secular guilds or mechanics' associations there were from a very early period, in Great Britain, religious guilds, resembling the religious societies of modern times, and many of these became rich and powerful institutions. From the time of Henry II, all such guilds were required to have a charter from the Crown. In 1388 a return to these guilds was ordered to be made, and it was then found that that of Corpus Christi, York, numbered 14,800 members. Some of the most objectionable features of the ancient guilds have again been developed by some of the trades unions, their modern representatives.

In France guild privileges were sold by the state from the 10th century till the revolution of 1789, and the position of the artisan had come to be a most pitiable one; but at that date every restriction on the exercise of any trade was removed. This was done also at a later period in Belgium, Holland, Italy, Sweden (1846) and Denmark (1862). The development of machinery in the 18th century tended to break up trade up trade guilds in all European countries. The workmen unwisely fought the introduction of machinery that reduced hand labor, and employers naturally secured outside workers and were able to manufacture and sell at a lower price. Many and bitter and bloody were the riots over the new methods and machinery, but in the end the power of the old guilds largely declined until machinery came to be generally accepted. Then came the modern labor movement. An account of the successors of the guild movements in America will be found under LABOR UNIONS. See also TRADE UNIONS for the modern European history of guilds.

GUILDER, a silver coin of Holland worth about 40 cents; formerly a gold coin. See FLORIN.

GUILDFORD, England, town and county-seat of Surrey on the Wey River 29 miles southwest of London and on the London and South Western, the London, Brighton and South Coast and the South Eastern and Chatham railways. The principal buildings are the ruins of a Norman castle; the old church of Saint Mary, dating from Norman times; the churches of Saint Nicholas and the Holy Trinity; the town hall; county-hall; Abbot's Hospital (1619); County Hospital (1866), and the Royal Free Grammar School founded in 1509. The chief industries are iron foundries and breweries and flour mills. A considerable trade is carried on in grain. Guildford is governed by a mayor, aldermen and councillors, and owns its waterworks and markets. Fairs are held for trade in cattle. It is a very old town, having been one of Alfred's possession, and was given in turn to his son Ethelwald. It became a borough in 1131, and county seat in 1885. Pop. 23,000.

GUILDHALL, the usual designation in England for the mediæval city halls, the most famous of which is the London Guildhall, King Street, Cheapside, first built in 1411, all but destroyed in the fire of 1666 and rebuilt in 1669. The façade dates from 1789. The great hall used for the famous city feasts, the election of city officers and members of Parliament, and for the public meeting of the livery and freemen, is 153 feet long, 48 feet broad and 55 feet high. It is decorated by statues of various celebrities, and in the common council room there is a collection of valuable paintings.

GUILDS. See CORPORATIONS, HISTORY OF; CORPORATIONS, LEGAL.

GUILFORD, Earl of. See NORTH, FREDERICK.

GUILFORD, Conn., town and borough of New Haven County, on Long Island Sound, and on the New York, New Haven and Hartford Railway, 18 miles east of New Haven. It was settled as Menunkatuck by English colonists in 1639, and one of the ancient stone buildings of that date is now used as a State museum. Guilford received its present name in 1643 when it was made a part of the New Haven Colony. It was incorporated in 1815 and in 1826 Madison was set off as a separate township. The regicides Goffe and Whalley are said to have come to Guilford in 1660 to surrender to William Leete, then governor of New Haven Colony, and to have been secreted for a time in the governor's cellar. Farming, canning, iron working and some woolen manufactures are the chief industries. Halleck the poet was a native and resident of Guilford. Pop. of town and borough 3,001; of town, 1,393. Consult Smith, R. O., 'History of Guilford' (Albany 1877), and *New England Magazine*, new series, Vol. I, (Boston 1884).

GUILFORD (gĭl'fŏrd) COLLEGE, N. C., town of Guilford County, on a branch of the Southern Railroad, six miles west of Greensboro. It was incorporated in 1895 and derives its name from Guilford College, a coeducational establishment controlled by the Friends, and founded here in 1837. The income of the college is $38,500, and it has a library of over 6,000 volumes. There is a Carnegie library and the town is the centre of a farming and dairying region. Pop. about 300.

GUILFORD COURT HOUSE, Battle of, 15 March 1781; in results one of the decisive battles of the Revolution. Cornwallis at Hillsboro proclaimed that he had conquered North Carolina, and called on the well-disposed to rally around him; Greene, awaiting reinforcements near the Virginia border, perceived the necessity of showing the patriots they were not abandoned, and advanced across the Dan. After some days of fencing and recruiting, Greene halted for battle at Guilford Court

House. He had about 4,400 men, but 3,000 were militia; and of his Continental regulars, only the Virginians and the First Maryland were veterans, the Second being new. Cornwallis had 2,213 trained troops. Greene posted his first militia line in an open field, to thin the British front before giving way; the second in a wood 300 yards back; the regulars on a rise 400 yards to the rear, near the court house. Their front was convex: the Virginians on the right, then in succession Singleton's artillery, Gunby and Howard's First Maryland and Ford's Second Maryland on the left. Lee's Legion and Campbell's riflemen guarded the left flank; William Washington's cavalry, Lynch's rifles, and the remnant of the Delaware regiment, the right flank. The British routed the first militia after it fired one or two volleys; but only drove the second from the wood after an obstinate and murderous combat. Advancing against the hill, their left was riddled by a withering fire, and then broken by a bayonet charge of the First Maryland; but their right crushed the second and captured two cannon. The first faced about and checked it; Washington in turn pierced the British line and retook the pieces. The first steadily crowded back their opponents with the bayonet: and Cornwallis only stayed the tide of defeat by ordering his artillery to open on the Marylanders through his own ranks, checking the pursuit at heavy loss to himself. Reforming, the British moved forward and with double the number of real troops, carried the hill and held it against every assault. Toward evening Greene after five hours' conflict withdrew, leaving his artillery on the field because the horses were killed. The American loss was 79 killed and 184 wounded and about 1,000 militia dispersed to their homes. Cornwallis lost 93 killed, 413 wounded, and 26 missing — 532 in all, or a quarter of his entire force. He announced a victory to Parliament, but Fox declared that «another such victory would destroy the British army»; and, in fact, Cornwallis had to fall back on Wilmington, abandoning his hold on the Carolinas, except two or three places on the coast, and shortly going to Virginia and capture.

GUILLAUME, gwĭ-yōm', **Eugene**, French sculptor: b. Montbard, France, 4 July 1822; d. Rome, Italy, 28 Feb. 1905. He opened his first studio at Dijon, and subsequently became a pupil of Pradier at Paris. In 1845 he carried off the Grand Prix de Rome. It was during studies at Rome that he manifested that mastery of the human form which appears in his 'Reaper,' which he modeled at Rome. It was subsequently cast in bronze, and is now in the Luxembourg. In 1852 he produced in marble the sitting figure of Anacreon with the dove of Venus. He was, however, less successful in ideal creations than in portrait busts. His statues of Napoleon I, as lieutenant of artillery and as emperor, his bust portraits of Archbishop Darboy, of F. Baloz, Ferry and Thiers are characteristic and dignified, but he is perhaps best known for his sculptures on the façade of the New Opera House, Paris (1869); 'The Fount of Poetry' (1873); 'Aopheus' (1878); 'Two Hermes'; 'Anacreon with Eros'; and 'Sappho with Eros and Andromache.' He was the designer of the medals given at the expositions of 1867 and 1878.

GUILLAUME LE BRETON, brē'tôn, poet and historian, b. 1159; d. about 1227. He attended the University of Paris; and on leaving there he became attached to the court of Philippe-Auguste as chaplain to the prince; by whom he was used to negotiate very delicate matters at Rome. He was also entrusted with the education of the king's son. A poem in 12 books entitled the 'Philippiade' (1222–24), is of very considerable historical interest, because the author, who wrote it three times between 1214 and 1226, had evidently made an exhaustive study of his subject and he has handled his material with very considerable skill. Another of his longer poems, entitled 'Karlotis' (which is mentioned in the 'Philippiade') was dedicated to the young prince of whose education he had charge; but this has unfortunately been lost. In the 'Philippiade' are interesting and valuable details of manners and customs of the times; information concerning military matters, all presented by the hand of a master chronicler and learned historian who had had the advantage of the best education afforded in his day. He also wrote a continuation of the Chronicle of Rigord which had been continued down to 1207; but his interest in his work caused him to extend it. There are numerous manuscripts of the works of Guillaume le Bretón, which is a proof of their popularity.

GUILLAUME DE LORRIS, lō-rē', French poet: b. Lorris, about 1215; d. about 1240. Nothing is known of him except that he was the author of part of the 'Roman de la Rose.' He is said to have written the first 4,000 lines to which Jean de Meun added, in a different style, 18,000 more lines. (See ROMANCE OF THE ROSE). Consult Langlois, E., 'Origines et sources du Roman de la Rose' (Paris 1891); Jarry, L., 'Guillaume de Lorris et le testament d'Alphonse de Poitiers' (1881).

GUILLAUME DE NANGIS, French writer and chronicler: b. about 1250; d. June 1300. He was a monk at Saint-Denis, where he became keeper of the archives in 1285; and he succeeded in making more of them and giving them more of life and interest than any of his predecessors had done. His existing literary work is quite extensive and of very considerable interest and historical value. He restored and completed the Latin annals in the monastery, wrote a 'Biographie de Saint Louis'; another of 'Philippe le Hardi'; 'A Latin Chronicle' (1292–93), and a 'Chronique Universelle' (1297). His French chronicle was subsequent to his death, continued by other writers; but none of these writers have equaled Guillaume de Nangis in literary style or interesting presentment of subject and selection of material. Nor have any of them left matter so interesting from the historical point of view. Consult Delaborde; Delisle, L.; and Lacurne de Saint Palaye, in all of whose complete works are to be found estimates of the work of Guillaume de Nangis and information of an interesting nature concerning him.

GUILLAUME D'ORANGE, ō-rānzh', popularly known as «short-nose,» because he had lost part of his nose in battle, a semi-legendary, semi-historical character, who gives the title to a large cycle of legends of the chivalric and troubadour class which cluster round the

Orange family. He is also known as Guillaume Fiérabrace and Saint Guillaume de Gellone. The extensive cycle of chansons de geste of which he is the dominant figure consist of 18 distinct branches, comprising in all about 120,000 verses. These dvisions are as follows, according to their poetical titles: (1) ‘Garin de Montglane’; (2) ‘Girart de Viane’; (3) ‘Aimeri de Narbonne’; (4) ‘Enfance Guillaume’; (5) ‘Le Courronement Looys’; (6) ‘Le Charroi de Nimes’; (7) ‘La Prise d'Orange’; (8) ‘Beuve de Comarchis’; (9) ‘Guibert d'Audernas’; (10) ‘La Mort d'Aimeri de Narbonne’; (11) ‘Les Enfances Vivien’; (12) ‘La Bataille d'Aleschans’; (13) ‘Le Moniage Guillaume’; (14) ‘Rainouart’; (15) ‘La Bataille de Loquifer’; (16) ‘Le Moniage Rainouart’; (17) ‘Renier’; (18) ‘Foulque de Candie.’ Although a native of the south, Guillaume d'Orange was a staunch supporter of the French king, Charlemagne, who had appointed him governor of Toulouse. This created for him many enemies throughout the Provincal countries; but he confronted them all and got the name of being a terrible enemy and an invincible warrior and leader. Hence it was quite natural that he should have become the hero of legend and story in an age when man worshipped the bold and the chivalrous. Among his other deeds which gave lustre to his name was his heroic part in the crusade set on foot by Louis, son of Charlemagne. During this military expedition Guillaume was the standard bearer, a position which gave an excellent opportunity to display his prowess. The Aimeri whose name appears in two of the foregoing legend titles, was, according to the legends themselves, the father of Guillaume. By him Guillaume was sent to the court of Charlemagne, he defeated a strong body of Saracens on the way. He arrived at Saint-Denis in time to witness the coronation of the emperor, by whom he was knighted for his youthful exploits. After his many adventures and heroic exploits which fill to overflowing a long life Guillaume founded the monastery of Gellone; and some time afterwards he retired from the world into the monastery of Saint-Guillaume du Désert not far from Montpellier. Later on he came forth from his retreat to defend Paris “from the infidels.” David-like, he battled with the monstrous giant Isoré and overcame him. When the fear of the invasion was over he returned once more to his ecclesiastical retreat, there to end his days in the sanctity of the Church.

Other Orange Stories existed in the Middle Ages, probably in considerable numbers, since various of the incidents forming the bases of the Guillaume d'Orange titles given above, are treated in different ways in other languages which, we know, habitually borrowed from the French throughout this period. Of these the most noted is the unfinished or mutilated poem, ‘Guillaume d'Orange,’ written in German by Wolfram von Eschenbach. According to this poem, Guillaume, the eldest of the sons of Aimeri, Count of Narbonne, eloped with the handsome young wife of Tybald, King of Arabia, and took her into the dominions of the French king. Tybald followed him with an immense host. Guillaume gathered together an army of 20,000 and faced the forces near Orange. The battle that followed was fierce; and no quarter was asked or given on either side. Defeated and most of his most trusty warriors slain, Guillaume fled to his castle, a very strongly-fortified place near Kiburg. Followed there by Tybald, he fled to the court of the French king, who had married one of his sisters. There he obtained a second army through the influence of his sister, the queen, and his father, who was at the court. Accompanied by the latter he set out for Kiburg once more, where he arrived just in time to prevent its falling into the hands of Tybald after a long siege and stout resistance. Pursuing the retreating Saracens, who had taken to flight on his approach, Guillaume came up with them on the seashore, where a second terrific battle resulted in the complete destruction of the enemy and the death of Tybald.

Among the various other versions of this story is one by the troubadour Bertrand, which bears the title ‘Diane et Aimeri,’ which also varies much from the versions given above. That these Guillaume d'Orange poems are older than the form in which they have come down to us seems more than probable, and that they must have had a powerful influence on the times in which they were popular seems certain. They are therefore of special interest as constituting one of the original foundations of French literature. They are also of special historical and antiquarian value owing to the vivid and truthful pictures they contain of the times in which they were composed and their reflection of those of an earlier age. Their relation to the knightly and chivalric romances is also an interesting subject which has not received all the attention it apparently deserves.

GUILLAUME DE PALERME, pä-lărm', hero of an old French romance of the same name. An English version under the title ‘William of Palerne’ was written in the 14th century. It tells the story of a poor fellow named Guillaume, who, falling in love with the daughter of the Roman Emperor, elopes with her from her father's court. They hide in the woods disguised as bears and are cared for by the were-wolf Alfonso, who has been transformed by his step-mother. Alfonso is a Spanish prince, and proves to be the brother of Guillaume. In return for Alfonso's kind hospitality, Guillaume restores his kingdom, overthrowing the king and the cruel stepmother, whereupon the charm is broken and Alfonso resumes his natural shape.

GUILLAUMET, gē'yō'mā', **Gustave Achille**, French artist: b. Paris, 1840; d. 1887. He pursued his studies at the Ecole des Beaux Arts, working under Picot and Barrias. In 1863 he was awarded the Grand Prix de Rome. His principal works are scenes in Algeria, where he traveled for a few years. Among these are ‘Evening Prayer in the Desert’ (1863); ‘Laghouat’; ‘The Seguia Ravine near Biskra’; ‘The Dogs of Douar’; and ‘The Famine.’ He published ‘Tableaux algériens,’ a series of articles on his own works.

GUILLEMIN, gēl'măṅ, **Amédée Victor**, French scientist: b. Pierre, Saône et Loire, 1826; d. 1893. After studying at Paris, he taught mathematics and wrote a number of scientific works including ‘Les mondes, causeries astronomiques’ (1861); ‘Simple explication des chemins de fer’ (1862); ‘Le ciel’ (1864); ‘La lune’ (1865); ‘Eléments de cosmographie’

(1866); ‘Les phénomènes de la physique’ (1867); ‘Les applications de la physique aux sciences’ (1873); ‘Les comètes’ (1874); ‘Le son’ (1876); ‘Les étoiles’ (1877); ‘Les nebleuses’ (1880); ‘Le monde physique’ (5 vols., 1880–85), and ‘Petite encyclopédie populaire’ (12 vols., 1886–91).

GUILLEMIN, Jacques Antoine, French botanist: b. Pouilly-sur-Saône, Côte d'Or, 1796; d. 1842. He studied at Dijon and Geneva, and then instructed in botany at Paris, where he became professor of botany at the horticultural institute in 1830. In 1838 he undertook an investigation of the tea plantations of Brazil for the government, in order to determine the feasibility of raising tea in France. His writings appeared in the various publications of botanical and scientific societies; and he is also author of ‘Recherches sur le pollen’ (1825); ‘Icones Lithographicæ Plantarum Australiæ Rariorum Decades Duæ’ (1832); ‘Considérations sur l'amertume des végétaux’ (1832).

GUILLOTIN, gē-yō-tăṅ', **Joseph Ignace,** French physician: b. Saintes, 28 May 1738; d. 1814. After studying at a Jesuit college, he served his novitiate in the order, and taught at the Jesuit college at Bordeaux. Soon after he began practising medicine at Paris. When the Revolution broke out, he became one of its ardent supporters, and it was his suggestion that all capital punishment be inflicted by use of a machine. The Terror adopted the instrument later and it became known by the name of its proposer. (See GUILLOTINE). Guillotin was chosen secretary of the National Assembly in 1790, and then retired. On the failure of the Revolution, he returned to Paris and again took up his practice.

GUILLOTINE, gĭl'ō-tēn, a machine for beheading, so called from Dr. Joseph Ignace Guillotin, and introduced during the French Revolution. It consists of two posts united at the top by a cross beam and furnished with grooves, in which a broad steel blade heavily weighted with lead descends by the impetus of its own weight on the neck of the criminal, fastened to a plank beneath. The certainty and speed with which this instrument separates the head from the body gives it an advantage over the axe or sword wielded by the hand. Machines of a similar description have been in use among many nations. In Italy, from the 13th century, it was the privilege of the nobility to suffer capital punishment by an instrument called the *mannaia,* closely resembling the guillotine. In Germany, likewise, during the Middle Ages, a mechanism resembling the guillotine was made use of, though the blade did not fall upon but was thrust through the neck of the criminal. There was formerly employed in Great Britain, also, and more especially in Scotland, an instrument of decapitation called the «maiden,» said to have been introduced by Regent Morton, who himself afterward suffered by it. It differed from the guillotine in this, that while the blade of the guillotine falls upon the neck of the criminal, in the maiden, the blade is fixed with its edge upward, and the neck of the criminal is forced down upon it by the fall of a heavy weight. Such an apparatus was also known and used at an early period in France. The Dutch likewise formerly made use of a decapitating machine.

Dr. Guillotin was not the inventor of the beheading machine which bears his name, and had only a secondary share in its introduction into France. As a member of the constitutional assembly he proposed to that body to abolish all class distinctions in the method of inflicting capital punishments, and with that view to have some instrument invented which might do the work more quickly and certainly than the hand of the headsman. The establishment of a new penal code having now become the subject of deliberation, a vote for a uniform system of capital punishment was, on the motion of Dr. Guillotin, passed on 21 Dec. 1780, with a recommendation that the least painful method of inflicting it should be adopted. It was not till 1792, however, that this special machine was selected after a report from Dr. Ant. Louis, secretary to the College of Surgeons. The guillotine was first erected in the Place de Grève at Paris, and the first execution performed by it on 25 April 1792, on a highwayman. Shortly afterward, in remembrance of Guillotin's original proposition, it received the name of «guillotine,» both popularly and in official language, and it was introduced wherever the penal code of France has been adopted.

GUILMANT, gēl-măṅ, **Felix Alexandre,** French organist: b. Boulogne, 1837; d. Meudon, 1911. His father was an organist, and the boy first studied under him. Later he had Lemmens and Carulli for his teachers, and at an early age, manifested particular aptitude and brilliance. At the age of 16 he received an appointment as organist of Saint Joseph's church. In 1857 he became choir master at Saint Nicholas church; in 1871 he occupied a similar position at La Trinité, and was appointed Chevalier of the Legion of Honor in 1893. Three years later he became professor of the organ at the conservatory at Paris. Guilmant made successful tours on the continent and in the United States. He composed ‘Belsazar,’ a lyric scena; a symphony for organ and orchestra, a number of organ sonatas and several vocal pieces.

GUILT, GUILTY. Guilt signifies a crime, offense or the state of being tainted with crime. Guilty signifies justly chargeable with crime. Guilty, in law, is the form of verdict given by a jury in criminal cases when the crime charged has been found proved. In England and the United States there are only two verdicts which can be given in such cases — guilty or not guilty; but a third or intermediate verdict may be given in Scotland — «not proven,» which, though in reality a verdict of «not guilty» (and so entered on record), yet is allowed to be given by juries when they are not satisfied that sufficient legal evidence has been given, but nevertheless consider there was some foundation for the charge, or at least some ground for suspicion. It has been objected to, this Scotch verdict, that it leaves a stigma on the party; nevertheless, it is firmly adopted in the law and practice of Scotland.

GUIMARÃES, or **GUIMARÆNS,** ge"-măr-rinsh, Portugal, a town in the district of Braga, Province of Minho, 35 miles northeast of Oporto on the Oporto-Corunna Railway. There are several interesting old buildings, including the birthplace of Alphonso, the first king of Portugal; the font where he was baptized in the Church of Santa Maria de Oliviera; the Church of São Domingoes, which dates from the 12th century and the town hall, a structure in the combined Moorish and Gothic style. The chief manufactures are cutlery, linen, leather, preserved fruits, textiles and paper. There is also considerable trade in wine and farm produce. The prehistoric Iberian town of Citania is not far off; and there are also hot sulphur springs at Taipas, which the Roman called 'Aquæ Levæ.' Pop. 9,000.

GUIMARÁS, gē-mä-räs', Philippines, an island 23¼ miles long by 10½ miles wide, lying west of Negros and south of Panay, forming with Panay the strait of Iloilo, and with Negros the strait of Guimarás, 6½ miles wide. The east coast is mountainous, the west coast, open and fertile; an excellent road follows the entire coast, except for a distance of 10 miles, and the most important towns are on this road. The products include rice, corn, cotton and tobacco, and there are important fishing interests.

GUIMBAL, gēm-bäl', Philippines, a pueblo of the province of Iloilo, island of Panay, situated on the southeast coast, 17 miles east of the town of Iloilo. Pop. about 8,000 in 1917.

GUINAAN, gē nä'än, a Malay tribe of the Philippines, inhabiting the watershed of the Rio Abra and the Rio Grande de Cagayan, island of Luzon, and the neighboring region of Isabela and Abra. They are a heathen, head-hunting tribe and have a distinct language.

GUINEA, a maritime region of western equatorial Africa, extending from the neighborhood of the Senegal to the vicinity of Cape Negro. This vast region forms the coasts of the Mandingoes, Ashanti, Dahomey, Benin, Biafra, Loango, Kongo, Angola and Benguela, connecting with the Atlantic distant territories by means of its rivers, especially the Senegal, the Gambia, the Niger, the Coanza, the Zaire or Kongo, and the old Calabar. Politically the region is divided into the French colony of Senegal, English settlements on the Gambia, the republic of Liberia, the Gold, Ivory and Slave coasts, the Kameroons, the Portuguese settlements, the Kongo, Gaboon and the Spanish settlements.

GUINEA, gin'ē, an English gold coin, first issued in 1663; by a proclamation issued 22 Dec. 1717, the guinea was declared current at 21*s.* sterling. Its true value, as derived from the market values of gold and silver at that time was 20*s.* 8*d.*, about $4.96. It has not been coined since 1817, when the sovereign supplanted it, but the fashion still prevails of quoting prices of some things in guineas and subscriptions are frequently recorded in the same denomination.

GUINEA, Gulf of, that portion of the Atlantic on the coast of Africa, between Capes Lopez and Palmas. Two of its arms are the bights of Benin and Biafra. The Niger flows into this gulf south of the bight of Benin. A number of small streams enter from French Kongo and Kamerun. It contains a number of islands, chief of which are Saint Thomas, Fernando Po and Prince's Island. The gulf has two currents, one setting eastward into the bights of Biafra and Benin and the other coming from the south; they meet in the bight of Biafra and unite in one stream which gradually expands as it flows northwest, then west and southwest.

GUINEA-CORN, a name given to durra. *Sorghum vulgare*, cultivated in the United States under the name of broom-corn. See Durra; Broom-corn.

GUINEA-FOWLS, a family of gallinaceous birds (*Numididæ*) allied to the pheasants and turkeys, natives of Africa and Madagascar. Twenty-three species are known, the most familiar being the common guinea-fowl of our poultry yard (*Numida meleagris*). This bird ranges in a wild state from Senegambia to the Niger River and is found also on the Cape Verde Islands. It is supposed to have been first brought to Europe by Portuguese explorers in the 16th century; but these fowls were domesticated in Rome during the classic period. Of the other species the vulturine guinea-fowl (*Acryllium vulturinum*) is one of the handsomest, being striped with brilliant blue; while the black guinea (*Phasidus niger*) and the turkey-like guinea (*Agelastes meleagrides*) are peculiar in possessing spurs.

GUINEA-GRASS, a kind of grass (*Panicum maximum*), often 6 to 10 feet in height, a native of western Africa, which has been naturalized in Florida, Central America, South America and the West Indies, and is largely cultivated for fodder.

GUINEA PEPPER, specifically the grains of the plant *Amomum meleguetta*, but also a general term for the seeds of different plants because of their peppery nature. Thus the seeds of the shrub *Xylopia æthiopica* is so called, although it is often termed Ethiopian pepper. In the 18th century the trade in these "grains" was thriving in West Africa, but the introduction of Eastern peppers killed the trade in West Africa.

GUINEA-PIG, a small, variable domesticated race of an uncertain South American species of cavy (see Cavy), bred in all parts of the world as a children's pet. It is about six inches long and exists in several races, some short-haired, others with long, curiously ruffled hair. The colors are greatly varied, white, black and tan and a mixture in quaint pattern of white and tan being preferred. It is a restless, grunting little creature, showing a small amount of intelligence, but gentle and amusing. It feeds on vegetables, bread, parsley, lettuce, etc., and is exceedingly cleanly in its habits. It begins to breed when five or six months old, the period of gestation being from 9 to 10 weeks, and the litters averaging four to five; and this extreme fecundity seems to be its only means of defense against extinction. The name is probably a corruption of "Guiana-pig," referring to its native home and its pig-like form and grunting. English children call them "cavies." They are bred by fanciers for show purposes and clubs exist for the improvement of standard breeds; and they are also in much demand as subjects of experiment in medical and bacteriological laboratories. Consult Crandall, 'Pets' (New York 1918).

GUINEA-WORM, a nematode worm (*Filaria medinensis*), the female of which may be three feet long, and as thick as a knitting-needle. It is a parasite in the feet and toes of residents of the East Indies and African coast, forming abscesses beneath the skin in which the worm is coiled up. It produces the disease known to the Greeks as dracontiasis, and one of those now called filariasis. To extract the worm it must be slowly wound upon a roll of paper, a little at a time, care being taken not to break the worm, as if a portion is left in the abscess, the young will develop and be scattered under the skin. Although formerly confirmed to the Old World, the guinea-worm has recently been found in the tropics of America, but is very rarely seen in northern parts.

GÜINES, gwē'nàs, Cuba, town in the province of Havana, 30 miles southeast of the city of Havana. It is the centre of a large plantation district, and is connected with Havana by a railroad dating from 1838, and electric cars. Güines was originally a large estate, and was gradually built up, receiving its charter in 1814. A fire destroyed it in 1817, when it was rebuilt. The cathedral dates from 1850. Pop. 8,200.

GUINEVERE, gwĭn'ē-vēr, the wife of King Arthur in the Arthurian legends (q.v.). In the first accounts of the Arthurian court, she plays a very unimportant part, and her character is not clearly portrayed. It is in the 13th century that the personality of the queen and the story of her love for Lancelot are first developed. The most vivid and powerful picture of Guinevere is that given by Tennyson in the 'Idylls of the King,' in which her sinful love for Lancelot is made the real cause of the downfall of the Round Table and Arthur's kingdom.

GUINEY, Louise Imogen, American poet: b. Boston, 7 Jan. 1861. She was graduated at Elmhurst Academy, Providence, studied afterwards under private tutors, and has lived abroad for several years. She began to write for publication in 1880 and was a frequent contributor to *The Pilot*, Boston. Her published works include 'Songs at the Start' (1884); 'The White Sail and Other Poems' (1887); 'A Roadside Harp' (1893); 'Martyr's Idyl and Shorter Poems' (1899); and in prose she has also published 'Goose-Quill Papers' (1885); 'Brownies and Bogies'; 'Monsieur Henri' (1892); 'A Little English Gallery'; 'Lovers' Saint Ruths'; 'Patrins' (1897); 'The Secret of Fougereuse'; 'England and Yesterday' (1898); 'Hurrel Froude' (1904); 'Robert Emmet — His Rebellion and His Romance' (1904); 'The Blessed Edmund Campion' (1908), etc. She has edited an edition of Mangan and of Matthew Arnold, and was joint author with Mrs. Spofford and Alice Brown of 'Three Heroines of English Romance' (1894).

GUINGAMP, gàn-gàn, France, town and capital of Côtes-du-Nord, an arrondissement in the northwest. The town is situated on the Trieux River, 20 miles west northwest of Saint-Brieuc. It contains a famous old church dating from the 14th century where annual "pardons" are granted to pilgrims. Other points of interest are the old fountain, the ruins of the ducal castle and of the town walls, the religious college, the mathematical schools and the museum. The chief industries are the manufacture of flour, leather goods and ginghams. Trade is carried on in cattle and agricultural products.

GUINICELLI, gwē-nē-chĕl'lē, **Guido,** Italian poet: b. Bologna, about 1240; d. 1276. He is called by Dante the father of Italian poets. He suffered exile with the Glubellines, and died expatriated. Only seven of his canzoni and five sonnets have survived, the most famous of which is 'The Gentle Heart,' admirably translated by D. G. Rossetti. The poems are marked by deep tender emotion and thoughtfulness, the mood which is exemplified by Dante in his 'Vita Nuova.' Guinicelli's works are published in Mannucci, 'Manuale della letteratura del primo secolo della lingua italiana' (Florence 1843). Consult Rosetti, D. G., 'Dante and His Circle' (London 1874).

GUINNESS, Sir **Benjamin Lee,** Irish philanthropist: b. 1 Nov. 1798; d. 19 May 1868. He was a member of the great Dublin brewing firm which bears his name, and is one of the largest in the world. He was elected lord mayor of Dublin in 1851, was member or Parliament for the city 1865–68, and created a baronet in 1867. He restored Saint Patrick's Cathedral, Dublin, at a cost of $700,000. His business in 1886 was placed in the control of a limited liability company, employing 3,000 persons and having a capital of £6,000,000.

GUINNESS, Sir **Edward Cecil,** Irish philanthropist: b. 10 Nov. 1847. He was the son of Sir B. L. Guinness (q.v.). In 1891 he became Baron Iveagh. He gave $1,250,000 for the purpose of erecting sanitary dwellings for working people at a low rent. Of this sum $1,000,000 was to be given to London, and the remainder to Dublin. The income obtained on the capital is to be employed in the same fashion.

GUINOBATAN, gē-nō-bä'tăn, Philippine Islands, a town in the province of Albay, Luzon, on the Inaya River, 9 miles northwest of Albay. It is the centre of a hemp-growing district. Pop. 20,000.

GUIRAUD, gē-rō', **Ernest,** French composer: b. New Orleans, La., 26 June 1837; d. Paris, 6 May 1892. He was the son of a composer who had won the Grand Prix de Rome in 1827, and was first educated by his father. Later he went to Paris to study at the Conservatoire, where he was also awarded the Grand Prix for his opera 'Bajaget et le joueur de flûte' (1859). From 1870–71 he served in the Franco-Prussian War, and five years later became professor of composition at the Conservatoire at Paris. Among his other works are 'Sylvie' (1864); 'Le Kobold' (1870); 'Madame Turlupin' (1872); 'Piccolino' (1876); 'Galante Aventure' (1882) and 'Gretna Green,' a ballet (1873). 'Brunhilde' an opera, was left unfinished, and was completed under the title 'Frédégonde' by Saint-Saens (1895). He published also several compositions for orchestras, a high mass and a treatise on instrumentation.

GUIRIOR, gē'rē-ôr, **Manuel Marqués de,** Spanish provincial governor: b. Aoiz de Ugarte, Navarra 1708; d. 1788. At the age of 25 he joined the navy, and finally rose to the rank of chief of squadron (1769). Two years later he set sail for New Granada in the capacity of viceroy and in the same year he was appointed president of the Audiencia of Sante Fé. His government was efficient and did much to promote the industries of those provinces. In 1776 he undertook the office of Viceroy of Peru, remaining there until 1780 when he was removed. He returned to Spain, where he spent the rest of his life. He published memoirs of his rule in New Granada and in Peru, which are preserved in García y García, J. A., 'Relaciones de los Vierreyes del Nuevo Reino de Granada' (New York 1869), and in Lorente, S., 'Relaciones de los Virreyes y Audiencias Perú' (Lima 1867–72).

GUISBOROUGH, gĭz'brŭ, England, town in the North Riding of Yorkshire, in the parliamentary division of Cleveland, 10 miles east southeast of Middlesborough on the North-Eastern Railway. The principal buildings are the church of Saint Nicholas; the town hall; the grammar school, founded in 1561; and the ruins of an Augustinian priory dating from the 12th century, in which Robert Bruce, grandfather of King Robert Bruce is buried. The principal industry is iron and steel founding, the supply coming from the neighboring mines. Pop. 7,050.

GUISCARD, gēs'kär, Robert. See ROBERT GUISCARD.

GUISCARD, Roger. See ROGER I.

GUISE (gü-ēz or gēz) **FAMILY, The,** French ducal house, a branch of the family of Lorraine. The founder was Claude, a younger son of René II, Duke of Lorraine, who in 1506 became naturalized in France, and in 1513 married Antoinette de Bourbon, the daughter of the Count of Vendôme. In his favor the county of Guise (one of his numerous possessions in France) was erected in 1528 by Francis I, into a duchy. He died in 1550, leaving five daughters (the oldest of whom, Marie, married James V, of Scotland, and was the mother of Mary, Queen of Scots) and six sons — François, who succeeded him in the duchy of Guise and his other dignities; Charles (usually known as Cardinal of Lorraine), Louis (Cardinal of Guise), Claude, François, and René, all persons of note. The family acquired great political importance on the accession of Francis II, who was married to Mary, Queen of Scots. François, the second Duke of Guise, was assassinated in 1563, and left three sons, Henri who inherited his father's titles; Louis, Cardinal of Lorraine and Archbishop of Rheims (both put to death in 1588 on the command of Henry III); and Charles, Duke of Mayenne. Henri, third Duke of Guise, was succeeded by his son Charles, who died in Italy in 1640, and was succeeded by his second son Henri. Henri died without issue in 1664, when he left the title to his nephew, Louis Joseph, Duke of Joyeuse and Angoulême. His son and successor, François Joseph, died in 1671, leaving only one son, who died at the age of five in 1675, when the direct line of the house of Guise became extinct. In 1704, the title was revived for the house of Condé.

GUISE, France, a town in the department of Aisne, on the Oise, 25 miles by rail northeast of Saint Quentin. It is an ancient city, mentioned as early as 1050, and has interesting remains of the 16th century castle of the famous Dukes of Guise. The town is noted for the ironworks of Dequerème et Cie founded by Jean Baptiste André Godin, and conducted on a profit-sharing plan. The workmen are provided with dwellings on the associated plan; the first portion of the *familistère* was erected by Godin in 1859–60 at a cost of $400,000. In connection with the workman's colony is a *phalanstère,* or common dwelling-house accommodating 400 families, a theatre, library and reading-room, schools, nursery, covered playgrounds, and a co-operative store. It was burnt by the English under John of Hainault in 1339, but the castle withstood the siege. In the onrush of the German troops on Paris at the beginning of the Great European War, the town fell into the hands of the invaders.

GUISLAIN, A. M. See LIMMANDER DE NIEUWENHOWE.

GUITAR, a stringed musical instrument, with an oval body, and a neck like that of the violin. The modern or Spanish guitar has six strings, the three highest of gut, the three lowest of silk covered with fine wire, and tuned to the E in the second space of the bass staff, A, its fourth, and the treble D, G, B and E. The intermediate intervals are produced by bringing the strings, by the pressure of the fingers of the left hand, into contact with the frets fixed on the key-board, while those of the right pluck or twitch the strings. The Spaniards are supposed to be the inventors of the guitar, and it is most widely used in Spain, though its use is quite general in other countries.

GUITEAU, gē-tō', **Charles Julius,** American assassin: b. about 1840; d. Washington, D. C., 30 June 1882. He became a lawyer in Chicago, and in 1880, after the election of James A. Garfield to the presidency, went to Washington, presumably to secure the office of United States consul at Marseilles, but did not succeed. Owing to this and the fact that the new President was opposed to the Stalwarts, led by Roscoe Conkling, Guiteau became greatly incensed. On 2 July 1881, he shot the President in the waiting room of the Baltimore and Potomac Railroad station in Washington; and on 19 September the President died from the effect of his wound. Letters taken from Guiteau after his arrest showed that he had planned to «remove» the President. He was indicted for murder on 7 October, was found guilty on 25 Jan. 1882 after a sensational trial in which insanity was the only plea offered for the defense, and was hanged in the District of Columbia jail, on 30 June following. See GARFIELD, JAMES A.

GUITRY, gē-trē', **Lucien Germain,** French actor: b. Paris, 1860. After spending nine years in Russia, at the Théatre Michael, Petrograd, he became prominent in the Paris theatres. In 1900 he became manager of the Porte Saint Martin, and of the Variétés in the following year. Shortly afterward he became stage director of the Comédie Française and director of the Renaissance where he scored great success. His chief rôles were in modern problem plays, in which his reputation is unequalled in the French contemporary theatre. Among his best interpretations are 'L'Assommoir'; 'La Veine'; 'L'Adversaire'; 'Le Mannequin d'Osier'; 'La Griffe': 'Le Voleur'; 'Sampson'; 'L'Emigré' and 'Chantecler.'

GUITTONE D'AREZZO, gwē-tō'nā dä-ret'so, Italian poet: b. near Arezzo, about 1230;

d. about 1294. Little is known of his life, except that he joined a religious brotherhood and founded the monastery Degli Angeli at Florence in 1293. His first poems are lyric love verses, but the later ones assume a didactic form, the subject matter being religion or politics. Some letters of his were published in 1745. His works have been edited by Valeriani, ‘Rime di Fra Guittone d'Arezzo’ (Florence 1828, and again in 1867). Consult Romanelli, ‘Di Guittone e delle sue opere’ (Campobasso 1875).

GUIUAN, gē′wän, Philippines, a pueblo of Sámar, on the extreme south coast, 78 miles southeast of Catbalogan, having a good harbor. On the edge of a reef near the town are several sulphur springs, which, though covered by the sea at high tide, are never brackish. Pop. about 12,000.

GUIZOT, gwē′zō′, **Elizabeth Charlotte Pauline,** French authoress: b. Paris, 1773; d. 1827. She was the first wife of François Guizot, and an author of considerable repute. In 1800 appeared her novel ‘Les contradictions.’ Shortly afterward she became literary and artistic editor for *Le Publiciste,* and published her contributions to this journal in 1802 under the title ‘Essaisde littérature et de morale.’ When she was forced to discontinue these essays because of illness, Guizot kept up the work anonymously. They were married in 1812. Her later publications include ‘Les enfants’ (1813); ‘Le journal d' une mère’ (1813); ‘L'Ecolier, ou Raoul et Victor’ (1821); ‘Nouveaux contes à l'usage de la jeunesse’ (1823); ‘Education domestique ou Lettres de famille sur l'éducation’ (1826). She also assisted her husband in his historical research. Several volumes of her critical writings were published posthumously by Guizot. Consult Sainte-Beuve, ‘Portraits des femmes’ (Paris 1884).

GUIZOT, gē-zō, **François Pierre Guillaume,** French historian and statesman: b. Nimes, 4 Oct. 1787; d. Valricher, near Paris, 13 Sept. 1874. His father, a lawyer, having in 1794 perished by the guillotine, his mother and her three sons retired to Geneva, where François was gratuitously educated at the gymnasium. In 1805 he commenced the study of law at Paris, but gradually drifted into the literary profession. In 1812 he married Mlle. de Meulan, a contributor to the *Publiciste,* and became professor of history at the Sorbonne. On the fall of the empire he obtained several public offices, such as councillor of state, and director-general of the departmental and communal administration. In 1816 he published ‘Du gouvernement représentatif et de l'état actuel de la France,’ and ‘Essai sur l'instruction publique.’ In 1820 the Duc de Berry was assassinated, and Guizot's party fell before an ultra-royalist reaction. In 1825 he lost his chair on account of the political character of his lectures, but regained it in 1828. In 1829 he again became councillor of state, and after the July revolution was appointed minister of the interior, but resigned in 1831. After the death of Périer, Guizot, along with Thiers and DeBroglie, formed a coalition ministry and rendered great service as minister of public instruction. He became ambassador at the British court in 1840, and next year was the real head of the government of which Soult was the nominal chief. He retained the office of minister of foreign affairs until 1848 and during that period opposed all measures of reform. After the fall of Louis Philippe, Guizot escaped, fled to England, and though he returned the next year he henceforth practically retired from public life. Born of a Calvinist family, he always remained a stern Protestant of the orthodox type, although he zealously supported the temporal authority of the pope, and had no sympathy with the aspirations of democracy. Among his numerous works may be mentioned: ‘Histoire de la civilisation en France’ (1830); ‘Histoire générale de la civilisation en Europe’ (1828); ‘Histoire de la civilisation de'Angleterre’ (1827); ‘Washington’; ‘Discours sur la révolution d'Angleterre’; ‘Méditations et etudes morales’; ‘Guillaume le Conquérant’; ‘Mémoires pour servir â l'histoire de mon temps’ (1858–68); ‘Méditations sur l'état actuel de la réligion Chrétienne’ (1865); ‘Mélanges biographiques et littéraires’; ‘Histoire de France racontée â mes petits enfants’ (1870); etc.

GUJARAT, gŭzh-rät, or **GUZERAT,** India, a region bordering on the Arabian Sea, comprising part of the northern section of the presidency of Bombay and some native states. Area of the whole, about 70,000 square miles; pop. about 11,000,000.

GUJARATI LANGUAGE AND LITERATURE. Gujarati is the language spoken in Gujarat, India, the northern maritime province of the Bombay Presidency, and in Baroda and neighboring states. It is spoken by about 11,000,000. It is descended from Prakrit, and is an intermediate language between the Saurasti and Sauraseni. It has borrowed from Arabic, Persian and Sanskrit, but not extensively, and has no important dialects, although there is considerable variation in the language as spoken by the educated and illiterate classes. The alphabet is a modified form of the old Devanagari Sanskrit script. It possesses a great body of literature, beginning with the works of Narsingh Meta, who flourished in the 15th century of the Christian era. Another great name in its literature is that of Rewa Sankar, who translated the ‘Mahabharata.’ Bardic chronicles are numerous, but in modern times the literature follows closely English models, and comprises a goodly number of translations from the latter tongue. Consult Taylor, G. P., ‘The Students' Gujarati Grammar’ (2d ed., Bombay 1908); Tisdall, W. St. C., ‘Simplified Grammar of the Gujarati Language’ (London 1892); Narmada, Sankar, ‘Narma-kos,’ a dictionary (Surat 1873); Kharbhari's ‘Dictionary’ (Ahmedabad 1899).

GULBARGA, India, an ancient city of Hyderabad, on an affluent of the Kistna River, 70 miles southeast of Sholapur and 110 miles west of Hyderabad. The principal points of interest are the ruins of the palaces and tombs of the Bahmani kings who made their capital there (1347–1422). The mosque of Jama Masjid, built after the mosque at Cordova, Spain, dates from the 13th century, and is unique in that it is entirely covered. It occupies an area of about 38,000 square feet. Other buildings are the public offices, barracks, bazaar and jail. The Great India Peninsula Railway has made Gulbarga a centre of trade for the locality. Cotton-spinning and weaving are important industries. Pop. 35,000.

GULBRANSON, Ellen, Swedish soprano: b. Stockholm, 1863. She studied at her native city and then under Marchesi in Paris. Appearing at first on the concert stage, she soon won fame in opera, her first star rôle being that of Brunhilda in Wagnerian opera. For many years she was the leading dramatic soprano at the Swedish capital, but went to Berlin in 1900. She married Hans Gulbranson, a Norwegian officer, in 1890.

GULDEN, gol'den, a gold coin once current in the Netherlands. Its value was different at various times.

GULES, gülz, in heraldry, the color red. When engraved, the gules was represented by perpendicular lines.

GULF OF SAINT LAWRENCE. See SAINT LAWRENCE, GULF OF.

GULF-STREAM. See CURRENTS, MARINE.

GULFPORT, Miss., city in Harrison County, on the Gulf of Mexico, and the Gulf and Ship Island and the Louisville and Nashville railroads. Gulfport has grown within a short time from a seacoast hamlet to a thriving city. The keynote of its success is the fact that it has one of the best harbors on the Gulf of Mexico. The harbor is accessible to large vessels and there is an extensive trade in lumber, naval stores and cotton. Prominent among its public buildings is the "Great Southern" hotel, which is widely known as a winter resort for Northerners and as a summer resort for the people of the South, especially those of New Orleans. It is situated directly on the shore and is undoubtedly the finest resort hotel between Tampa and New Orleans. Other prominent buildings are Gulf Coast Military Academy, the postoffice building, the county courthouse and those of the First National bank and of the Gulf and Ship Island railroad. The latter is used for the offices of the company. The First National bank is now the largest bank in the State of Mississippi, having a capital of $250,000. The most important manufacturing plants are oil and fertilizer factories, the Gulfport Packing Company and the shops of the Gulf and Ship Island railroad. There are, also, numerous other concerns, such as iron foundries, fertilizer works, cottonseed-oil mills, canning factories, roller, saw and planing mills and wood-working plants. The commission form of government was adopted in 1912. Pop. 6,386.

GULFWEED, a genus (*Sargassum*) of seaweeds of the family *Fucaceæ*, which grow in deep water along all warm coasts, and becoming easily detached, are found floating in immense quantities in the middle of all oceans, where they accumulate in vast eddies, as it were, of the oceanic currents. The North Atlantic species (*S. bacciferum*) is the best known, and takes its popular name from its presence in long yellow lines in the Gulf Stream; and its specific name from the berry-like appearance of its air-vessels. The frond is very long, and is furnished with distinct, stalked, nerved "leaves" and simple axillary stalked air-vessels; and its structure approaches that of the higher plants. Where the Gulf Stream is deflected from the banks of Newfoundland eastward, and sends off its more southern branch toward the Azores, is situated the Sargasso Sea, "that great bank of weeds, which so vividly occupied the imagination of Christopher Columbus, and which Oviedo calls the seaweed meadows" (Humboldt). The quantity of floating seaweed is often such as to impede the progress of ships. Multitudes of small marine animals accompany it, with fishes ready to prey on them, constituting a distinct and considerable fauna. The gulfweed is eaten in China, and in other parts of the East also it is used in salads and as a pickle.

GULICK, John Thomas, American clergyman: b. Kauai, Hawaii, 13 March 1832. He was graduated at Williams College in 1856, studied theology at the Union Theological Seminary, went to China as a missionary, and subsequently to Japan. He is a well-known writer on topics relating to evolution and natural history. He contributed to the ‘Journal’ of the Linnæan Society of London: ‘The Diversity of Evolution under One Set of External Conditions’ (1872); ‘Divergent Evolution Through Cumulative Segregation’ (1887); ‘Intensive Segregation’ (1889); and other monographs.

GULICK, Luther Halsey, American author and educator: b. Honolulu, H. I., 4 Dec. 1865; d. South Casco, Me., 13 Aug. 1918. He studied at Oberlin College; at the Sargent School of Physical Training at Harvard, and received a physician's degree from the Medical College at New York University in 1899. From 1887–1900 he superintended the physical training department of the Y. M. C. A. Training School at Springfield, Mass., and resigned in order to become principal of the Pratt Institute High School in the last mentioned year. Three years later he was placed in charge of the physical training in the public schools of New York city, and from 1908–13 was director of the department of child hygiene of the Russell Sage Foundation. Dr. Gulick was president of various societies interested in physical training, such as the American Physical Education Association (1903–06); of the Public School Physical Trinity Society (1905–08); the Playground Association of America (1906–09), and the Camp Fire Girls of America (since 1913). He was also editor of magazines devoted to this subject including *Physical Education* (1891–96); *Association Outlook* (1897–1900); *American Physical Education Review* (1901–03) and the *Gulick Hygiene Series*. His works include ‘Physical Measurements and How They Are Used’ (1889); ‘Physical Education by Muscular Exercise’ (1904); ‘The Efficient Life’ (1907), a book which attracted much notice; ‘Mind and Work’ (1908); ‘The Healthful Art of Dancing’ (1910). Jointly, he was author of ‘Medical Inspection of Schools’ (1907).

GULL, SIR **William Withey,** English physician: b. Colchester, 31 Dec. 1816; d. London, 29 Jan. 1890. He was the son of a barge-owner and through the kindness of friends received an education in medicine. He became lecturer in medicine at Guy's Hospital in 1843, and assistant physician in 1851. Five years later he was appointed physician. From 1847–50 he was professor of physiology at the Royal Institution and was honored by election to the Royal College of Physicians in 1848. For his services to the Prince of Wales he was created a baronet (1872). As a clinical physician, he was among the most noted of his time. His writings were published from time to time in the ‘Reports’ of Guy's Hospital.

GULLIVER'S TRAVELS. ‘Gulliver's Travels,’ or more fully, ‘The Travels of Lemuel Gulliver,’ was published late in 1726, during the last visit of the author, Jonathan Swift (1667–1745) to England. It was immediately popular and has since its publication enjoyed the reputation of being at once a popular child's book and the best known satire in the English language. Swift may have had the idea in mind as early as the days of the Scriblerus' Club and he definitely refers to it in a famous letter to Pope, dated 29 Sept. 1725: “I like the scheme of our meeting after distresses and dispersions, but the chief end I propose to myself in all my labors is, to vex the world rather than divert it. . . . I have ever hated all nations, professions and communities; and all my love is toward individuals, . . . But principally I hate and detest that animal called man; although I heartily love John, Peter, Thomas and so forth.” Swift succeeded in vexing only a very few individuals; on the contrary, he diverted the world exceedingly, for the simple reason that individuals laughed at his wit and presumably felt themselves to be excluded from his general satire.

The story, which concerns itself with voyages to very strange lands, is divided into four books: First, Lilliput, the land of the pigmies; second, Brobdingnag, the land of the giants; third, the various lands of Laputa and Balnibarbi, the land of mathematicians, projectors and cranks, Glubbdubdrib, the land of magicians, Luggnagg, the land of the Struldbrugs, and Japan; and fourth, the land of the Houyhnhnms, or the humane horses.

In the first of these books, Swift describes a highly organized civilization of pigmies, one-twelfth the height of ordinary men. Aside from this pleasing device, Swift makes the Lilliputians the means of satire by representing these small creatures as possessed of the same political systems, motives, vanities and so forth, as normal men, which in such small people are essentially ridiculous. He causes readers to laugh at their antics for much the same reason as grown-ups are apt to laugh at the imitative ways of children or apes. In particular, Swift satirizes the court intrigues of his own time. In the person of Flimnap he lampoons Sir Robert Walpole, and in the famous faction of the Big-Endians he satirizes English political parties.

In the second book, the position is reversed. The attractive, diminutive Gulliver, one-twelfth the height of the giants, having been found and exploited as an object of curiosity by his peasant master, comes into the hands of the king, who proceeds to ask Gulliver all manner of questions regarding European politics and society. Gulliver's answers, which he affects to make more favorable to his “noble and most beloved country” than truth strictly allows, are nevertheless severely criticized by the king, who comes to the conclusion that the Europeans are “the most pernicious race of little odious vermin that nature ever suffered to crawl upon the surface of the earth.” The chief point of satire lies in the comment that a large generous mind might make upon the civilization to which we are accustomed. To a less degree it lies in the magnification of certain disagreeable human qualities. As the gist of the first book might lie in the exclamation, “What a vain little thing is man”! so that of the second book might answer the exclamation, “How small minded is man”!

The miscellaneous third book, which deals with special abuses of various kinds, satirizes pedantry, projecting, absurd affectations, etc., and, in the famous passage of the Struldbrugs, the conventional fear which people have of death and their desire to live eternally on the earth. The various occupations of man are treated as absurd and irrational, but it must be noted that Swift does not always draw the line clearly between legitimate occupations and the extravagances into which these may sometimes run.

The fourth book goes beyond the others in that human beings are made not merely small or large or the possessors of peculiar contrivances, but are actually distorted into the very disagreeable creatures known as Yahoos, whose deformities and uncouth ways are treated without reticence. Man is represented as a beast of very unattractive kind, the good qualities of courtesy, intelligence and mercy residing in his masters, the horses. It may be observed in general that Swift's satire, starting with considerable geniality, becomes more and more bitter as the narrative proceeds and at the end is quite unrestrained.

Owing largely to this growing bitterness, the last books are certainly far less popular and attractive than the two earlier books. Moreover, the graphic narrative of the two earlier books is probably more interesting. They recount events with great straightforwardness and simplicity. Details are very carefully worked out to scale and are sufficiently numerous and concrete to constitute one of the best pieces of narrative that we have in English. As an example of straightforward, simple, vigorous narrative, ‘Gulliver's Travels’ stands with ‘Robinson Crusoe,’ ‘Pilgrim's Progress,’ and a very few other books. In addition to this, the story, like the others that have been mentioned, contains an interesting view of human life, though one vastly different and entirely satirical in tone.

Generally speaking, Swift's satire might be called the satire of position, especially in the first two books. That is to say, Swift does not depend upon burlesque, parody, on pure wit or allegory as often as in ‘The Battle of the Books’ and ‘A Tale of a Tub,’ but on straight narrative, in which, however, he steps aside from ordinary conceptions in order to make those conceptions appear in a different light. The best example of this is to be found in chapters six and seven in the voyage to Brobdingnag, in which the king of the giants pursues the spirited but apologetic Gulliver from position to position up to a situation of great irony.

The most successful short life of Swift is that of the late Sir Leslie Stephen in the ‘English Men of Letters’; compare also the shorter sketch in the ‘Dictionary of National Biography.’ The best longer life is that of Sir Henry Craik 1882. Good cheap modern editions of ‘Gulliver’ are in ‘Everyman's Library’ and the ‘Bohn Library.’

William T. Brewster,
Professor of English, Columbia University.

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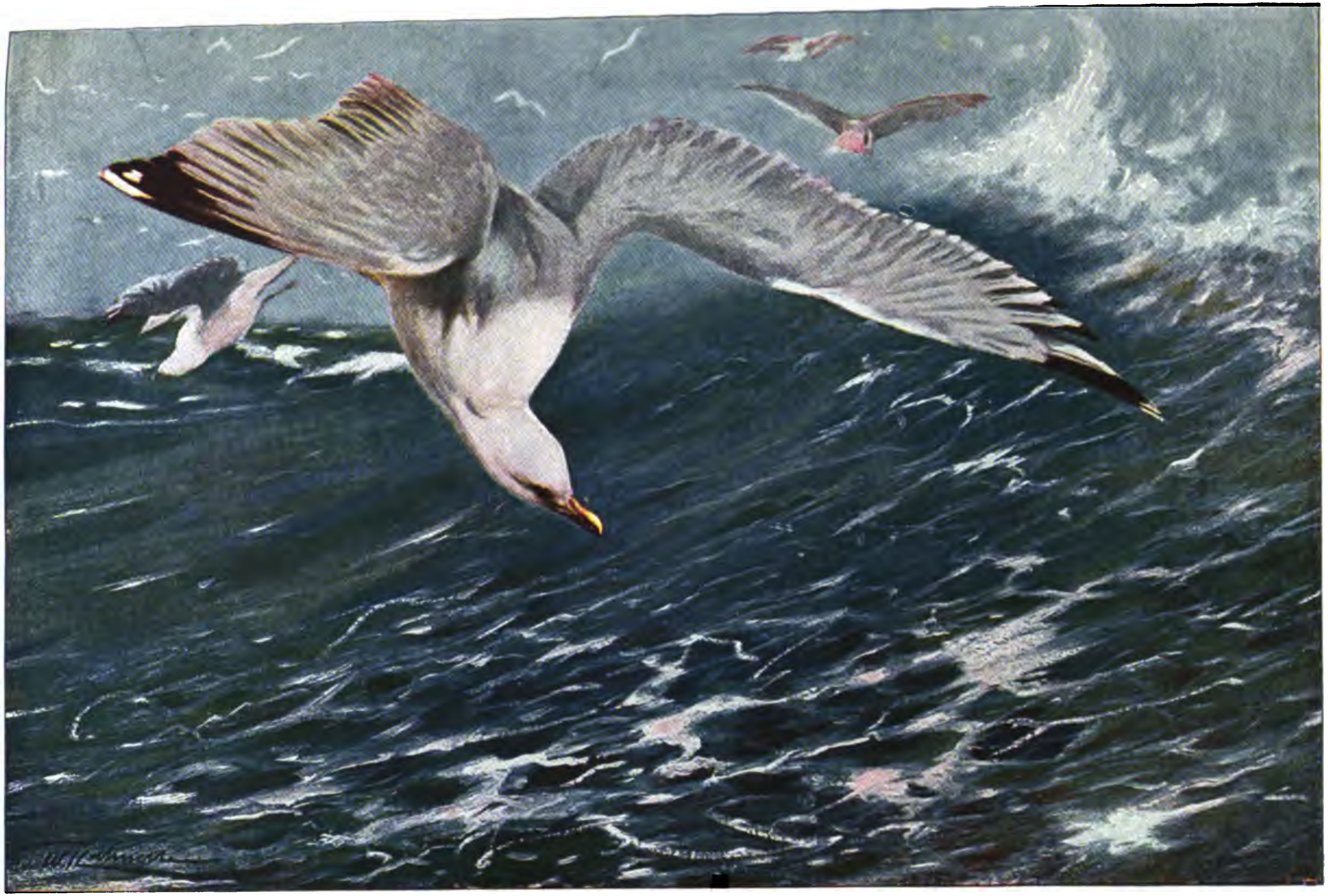
William T. [illegible]

Professor of English, Columbia [illegible]



HERRING GULL (*Larus Argentatus*)

GULLS, a large group of sea-birds found throughout the world and constituting, together with the terns (q.v.), skinners (q.v.), and skuas or jaeger-gulls, the family *Laridæ* (q.v.). Some 53 species of gulls are known, ranging in size from that of a pigeon to that of a goose. The prevailing color is pure white below and pearl gray above, while some species have a gray or blackish head, and a few are dull gray all over. The young birds of all species are dusky during the first year. They walk with tolerable ease, and swim well, but are incapable of diving. They keep much on the wing, and their flight is rapid, strong and long sustained, even in heavy gales. In sitting they contract their necks and rest on one foot. They nest along the shores in the grass, on rocky cliffs or rarely in small trees, forming the nest of dry grass, sedges, etc., and invariably in colonies, creating a great uproar when their nesting-grounds are visited. The wild characteristic note is, in the bigger species, harsh and querulous, in the smaller a “laughing” or screaming; the lesser skuas give vent to a curious mewing cry and the great skuas to a similar but deeper sound. At the breeding-quarters the utterances are naturally more agitated and shrill, and the parents hang excitedly above a visitor's head. “The food,” says Evans, “consists mainly of fish, mollusks, crustaceans, and worms, but is varied in the stronger forms by small mammals, young birds and eggs; the great black-backed gull undoubtedly attacks lambs and weakly ewes; carrion is not uncommonly devoured; and *Larus maculipennis* acts as a scavenger at Buenos Aires, besides clearing the country of grasshoppers, and robbing the Cayenne lapwing of its insect booty. Skuas give chase to their smaller kin, and force them to disgorge the fishes they have just caught, while even solan geese are sometimes victimized; *Larus scopulinus*, moreover, which robs the oyster-catcher of New Zealand, is a further instance of parasitic habits. Insects and their larvæ, turnips, berries and grain are also eaten by these omnivorous but useful creatures.”

Most gulls are migratory and scatter far along the coasts during fall and winter in search of food. On the eastern coast of the United States are five species. The large herring-gull (*Larus argentatus*) breeds on the coast of Maine and winters to the southward, being abundant about all harbors and along tidal rivers from October to April. Associated with them are sometimes seen the larger black-backed gull (*L. marinus*). In summer are present the smaller black-headed or laughing gull (*L. atricilla*) which nests plentifully on the salt marshes of the Middle and Southern States. The Bonaparte's and ring-billed gulls (*L. philadelphia* and *L. delawarensis*) breed on our northern coasts. In the interior Franklin's gull (*L. franklini*) inhabits the lake shores and marshes of the upper Mississippi Valley; while on the Pacific coast occur several other species. In the arctic regions the most abundant gull is the great Burgomaster (*L. glaucus*), one of the largest species, which wanders some distance southward in winter. Two other species peculiar to the far north are the pure white ivory gull (*Pagophila alba*) and Ross's rosy gull (*Rhodostethia rosea*). The latter is one of the rarest of birds and one of the most beautiful, the whole under surface being suffused with pink and the neck surrounded by a dainty collar of gray. It has been seen in numbers only by the arctic explorers Murdoch and Nansen. The Kittiwake (*Rissa tridactyla*) is another species of circumpolar distribution, peculiar in lacking the hind toe. Several of these species are known on the coasts of Europe or Asia; and the gulls of other parts of the world present little that is peculiar. Large areas of coastal beaches and islands formerly inhabited by gulls in various parts of the world, but especially along the eastern coast of the United States, have been wholly depopulated of these beautiful and useful birds by the incessant robbery of their nests for the sake of the eggs — which are conical in form, and white or greenish, heavily blotched with purple and brown in color — or for the sake of their plumage to be used in millinery trimmings. Protective laws now prevent this waste of life. Consult Evans, ‘Birds’ (1900); Coues, ‘Birds of the Northwest’ (1874); Baird, Brewer and Ridgway, ‘North American Water Birds’ (1884); Newton, A., ‘A Dictionary of Birds’ (London 1896).

GULLSTRAND, gool'stränt, **Allvar**, Swedish optician: b. Landskrona, Sweden, 5 June 1862. His father was chief physician of Landskrona. He was educated at Upsala, Vienna and the Carolinian institute of Stockholm, receiving honorary degrees from Upsala, Jena and Dublin. In 1911 he received the Nobel prize for medicine. Dr. Gullstrand is a member of the medical societies of several countries and has published ‘Allgemeine Theorie der monochromatischen Aberrationen und ihre nächsten Ergebnisse für die Ophthalmologie’ (1900); ‘Die reelle optische Abbildung’ (1906); ‘Die optische Abbildung in heterogenen Medien und die Dioptrik der Kristallinse des Menschen’ (1908); ‘Einführung in die Methoden der Dioptrik des Auges des Menschen’ (1911); ‘Das Allgemeine optische Abbildungssystem’ (1915). He has contributed articles to the encyclopedia, ‘Nordisk Familjebok,’ and to Helmholtz's ‘Handbuch der physiologischen Optik’ (1910).

GULS HORNEBOOKE, The, a book by Thomas Dekker (q.v.), written in 1609. Its chief interest lies in the fact that it gives a vivid picture of the life of the so-called “gull” or dandy of the period. It is said to be based on Dedekind's ‘Grobinius.’ Consult McKerrow, R. B., ‘The Gull's Hornbook’ (London 1904).

GUM ARABIC, a gum of the *Acacia arabica*, which grows in India and Arabia. Gum arabic can be obtained also from other acacias. Gum arabic occurs in transparent white tears, which are often colored yellow or brown by impurities; it cracks on exposure to the air on the surface; it is brittle, and has a bland, mucilaginous taste. It dissolves in water, and the solution gives a precipitate of arabin on the addition of hydrochloric acid. Gum arabic contains about 70 per cent of arabin, $2C_6H_{10}O_5+H_2O$, and 17 per cent of water; the rest consists of potash and lime, which are combined with the arabin.

GUM-BOIL, an abscess in the gum caused by inflammation, generally the result of toothache or of the presence of decayed teeth. The carious tooth or stump, if the inflammation proceeds from this cause, should be removed. When matter has formed it should be evacuated by a free incision, and the mouth should be frequently washed with tincture of myrrh and water. See DENTISTRY; TEETH.

GUM-RESINS are complex mixtures obtained from plants. They contain both a gum, which is soluble in water, and a resin, which dissolves in spirit. There are usually present in addition essential oil, coloring and extractive matter, and a variety of impurities. The gum-resins have frequently a strong and characteristic taste and smell. They are solid, opaque and brittle. The common gum-resins are aloes, ammoniacum, asafœtida, euphorbium, galbanum, gamboge, myrrh, olibanum, opoponax, sagapenum and scammony.

GUM-TREES, a name for several different trees: (1) those of the Australasian genus *Eucalyptus* (q.v.); (2) in the United States, the pepperidge or tupelo, various species of which are called black, sour, cotton-gum, etc. (see TUPELO); (3) the *Liquidambar* (q.v.).

GÜMBEL, Karl Wilhelm von, BARON, German geologist: b. Dannenfels, 1823; d. 18 June 1898. He received his education at Munich and Heidelberg, and later conducted investigations of the coal mines at Saint Ingbert. In 1851 he became chief geologist of the Geological Survey of Bavaria; in 1863, honorary professor of geognosy and surveying at Munich; and in 1879, director of the Bavarian mining department. He published a geological map of Bavaria in 1856, together with a description under the title ‘Geognostische Beschreibung des Königreichs Bayern’ (1861, 1868, 1879). In the study of paleontology, Dr. Gümbel did some important research on the fauna of the Trias, and the Foraminifera. He also discovered two minerals which have been named for him, *gümbelite*, a fibrous mineral composed of hydrous silicate of alumina; and *guembelina*, a petrified corralin. He was elevated to the nobility in 1902. Besides his geological reports above mentioned, he wrote ‘Anleitung zu wissenschaftlichen Beobachtungen auf Alpenreisen’ (1879–82).

GUMBINNEN, goom-bĭn'nĕn, Prussia, the capital of a government with an area of 6,125 square miles. The town is on the Pissa, 22 miles by rail southwest of Edytkuhnen on the Russian frontier. It is comparatively modern, its municipal charter dating from 1722. There are manufactures of woolens and linens, leather, machinery, castings, forgings, furniture, bricks, lumber, dairy stuffs, yeast and spirits, and a trade in cattle and agricultural produce. Pop. 14,540, mostly the descendants of Protestant exiles from Salzburg.

GUMBO. See HIBISCUS; OKRA.

GUMILLA, goo-mēl'lya, José, Spanish missionary: b. Barcelona, 1690; d. 1758. Entering the Jesuit Order, he went to South America in 1714, and became superior of the missions on the Orinoco. On his return to Spain he became head of the College of Cartagena (1734). In 1738 he held a similar office at the University at Madrid. While in South America he made studies of the flora and fauna and wrote a work descriptive of the country of the Orinoco called ‘El Orinoco ilustrado y defendido’ (1745).

GUMMA, gŭm'ạ, a tumorous deposit that occurs in the tertiary stage of syphilis (q.v.). It affects most frequently the bones, cartilages, skin and periosteum. They are made up of a hard connective tissue which tends to undergo softening, causing destruction of the part and deep ulceration if near the surface. The periosteum of the cranial bones is particularly liable to be affected, causing dangerous pressure on the brain.

GUMMERE, gum'ăr-ē, Francis Barton, American philologist and author: b. Burlington, N. J., 1855. He studied at Haverford and at Harvard and then went to Germany where he took courses at Leipzig, Berlin, Strassburg and Freiburg. On his return to the United States he became professor of English at Haverford College (1887). In 1905 he was chosen president of the Modern Language Association of America and in 1913 became a member of the National Institute of Arts and Letters. He is likewise a member of other scholarly societies. Among his publications are ‘The Anglo-Saxon Metaphor’ (1881); ‘Handoook of Poetics’ (1885); ‘Germanic Origins’ (1892); ‘Old English Ballads’ (1894); ‘The Beginnings of Poetry’ (1901); ‘The Popular Ballad’ (1907); ‘The Oldest English Epic’ (1909); ‘Democracy and Poetry’ (1911).

GUMMERSBACH, goom'mĕrs-pah, Prussia, capital of the province of Westphalia, 30 miles northeast of Cologne. There are important manufactureres of cardigan jackets, carpets, woolens, papers, machinery, electrical wares and boilers. There are stone quarries in the vicinity. Pop. 16,000.

GUMMING, or GUMOSIS. See PLANTS, DISEASES OF.

GUMPLOWICZ, goom-plō'vich, Ludwig, Austrian sociologist: b. Cracow, 1838; d. 1909. After pursuing his studies at Cracow and Vienna, he entered the teaching profession and became professor in the University of Graz in 1882. He wrote several important works on the subjects of political economy and social science. They include ‘Philosophisches Staatsrecht’ (1877); ‘Verwaltungslehre’ (1882); ‘Der Rassenkampf’ (1883 and again in 1909); ‘Grundriss der Sociologie’ (1885, 1909); ‘Das österreichische Staatsrecht’ (1891); ‘Sociologie und Politik’ (1892); ‘Die sociologische Staatsidee’ (1892); ‘Geschichte der Staatstheorien’ (1905); ‘Das allgemeine Staatsrecht’ (3d ed. 1907).

GUMRI. See ALEXANDROPOL.

GUMS, various mucilaginous substances, generally obtainable from the sap of trees. They are soluble either in cold water or in alcohol. Many aromatic products such as are employed in making perfumes and incense are to be classed as gums. Gum Arabic is the best known among such products. It is obtained from the Senegal Acacia in Western Africa. There are no less than eight or nine varieties of this gum. Gum tragacanth comes from the *Astragalus gummifer*, in western Asia. Cherry-tree gum, whose name tells its origin, is used for stiffening felt, as in hat making. There are some gums which might perhaps more properly be classed as resins, and are sometimes styled gum-resins; many of which are used in medicine.

GUNTI, gŭn'tē, a river of northern India. It takes its rise in a small lake or depression in the Pilibhit district of the United Provinces. Its course is tortuous but its general direction is southeast for about 500 miles. It joins the Ganges river about 20 miles below Benares, Lucknow and Jaunpur are the principal towns along its course, and it is navigable for vessels of 17 tons as far as Lucknow. At Jaunpur there is a bridge of 16 arches dating from the 16th century. Gunti is also the name of a small river of eastern Bengal and Assam in the Tippera district.

GUN, a strongly-constructed metal tube, from which destructive projectiles are expelled by the gradually increasing pressure of gas evolved from fired gunpowder or other explosive. The term comprehends every description of firearm, from cannons, mortars and other heavy pieces of ordnance, to the fowling-piece, rifle and pocket-pistol. See ARMS; ARTILLERY; FIRE-ARMS; GUNS.

GUN-FIRE. See GUNNERY.

GUNBOAT, a term originally applied to small craft mounting usually a single gun and employed exclusively in the defense of coasts and rivers. Experiences in the Crimean War suggested the extension of the use of gunboats to offensive warfare.

In the United States the gunboat figured to a very considerable extent in coast and lake warfare in our first two wars. They were first used on the Delaware River, in 1775–76 and drove the British frigate *Reliance* out of the roads. In December 1807 there were 69 of them in United States service, and the Congress ordered 188 more built, as an auxiliary to the embargo declared a few days later, making 257 in all. Improved ordnance has made them valueless, and they had a bad effect on the service, but there was strong opinion in their favor at the time, and they did good service in the War of 1812. The theory was that these movable batteries could act in water where large vessels could not, could be concentrated against the latter so as to afford as large an armament, yet present only a number of small targets, while their antagonist presented only one large one; that shots aimed too high would do no harm to gunboats, but would injure masts and rigging of frigates; that loss of rudder and sailing gear, the most crippling of accidents to a ship, could not happen to the gunboats, propelled and steered by sweeps; that nearness to the water level gave the guns more accurate aim; and that 75 gunboats could be built for the cost of one 36-gun frigate. On the other hand the instability and unseaworthiness of the gunboat greatly limited its sphere of usefulness. In most countries the gunboat has been superseded by modern torpedo-boats and destroyers except for use in rivers.

Old gunboats have been converted into mother ships for submarines, airplanes and other small craft.

GUN-CARRIAGE, or GUN-MOUNTING. See ARTILLERY; FORTIFICATION; ORDNANCE.

GUNCKEL, John E., philanthropist: b. Germantown, Ohio, 14 Aug. 1846; d. Toledo, Ohio, 15 Aug. 1915. His parents were pioneers in the town in which he lived. After attending public school a few years he completed his education at Oberlin College. Mr. Gunckel went to Toledo, Ohio, in 1878 where he engaged in the railroad business; from ticket agent he was promoted to traveling passenger agent, and served in that capacity for twenty years. During his railroad career he came in contact with many newsboys in whom he evinced a deep interest, and in 1893 he organized the "Toledo Newsboys Association" of which he was the president till his death. He also organized and was president of the "National Newsboys Association," with branches in more than a hundred cities. The city of Toledo, Ohio, owes much to the life of Mr. Gunckel, and his philanthropic work will ever be a monument to his memory. At Woodland Cemetery an impressive memorial in pyramid form, composed of pebbles and stones collected by newsboys and friends from all parts of the globe, marks his resting place.

GUNCOTTON is the name originally assigned to the material produced by Schoenbein, of Basle, Switzerland, in 1845 by treating cotton with a mixture of strong nitric and sulphuric acids. The discovery that starch, woody fibre, and similar substances give rise to the formation of highly combustible bodies when acted upon by concentrated nitric acid is attributed to Braconnot in 1832, and he styled the bodies so produced generically *xyloidine.* Six years later Pelouze took up this subject and extended his investigations to the behavior of cotton, paper and vegetable substances generally, and later Dumas prepared from paper by this means the substance which he called *nitramidine.* No practical result followed these observations until the discovery by Schoenbein of the advantages which followed the use of the acid mixture; a discovery which was also independently made by Boettger, of Frankfort, in 1847 and by Knop, of Hanover, and Taylor, of England, in 1847. The discovery aroused the liveliest expectations which were stimulated by the facts that the explosive was much more powerful than gunpowder and that when used as a propellant it gave little or no smoke. Experiments and tests were begun shortly after with the new explosive in Germany, France, Austria, England, Russia, and the United States with a view of utilizing it as a substitute for gunpowder in guns. Unfortunately the material, as manufactured, was found to be not only so irregular in action that it was likely at any time to burst the piece, but also so unstable as to give rise to numerous accidents so that, especially after the serious and, at the time, inexplicable explosions at Vincennes and Bouchet in France, and Faversham in England, the experiments were discontinued except in Austria, where Baron von Lenk gave the matter close and long-continued study and came to the conclusion that the grave defects noted were not inherent in the material, but were due to the imperfect and irregular methods of manufacture, the failure to purify the cotton before treatment with the acid, and the failure to purify the guncotton and free it completely from acids after treatment. Following these convictions he improved the method of manufacture to such an extent that in 1862 the Austrian army had 30 batteries provided with guncotton cartridges made up by twisting the fibre into yarns which were braided together, but the spontaneous explosions at the magazine at Simmering in 1862 and at Steinfeld in 1865, together with the fact that the guncotton cartridges still gave at unexpected times abnormal pressures led to its further use in Austria being interdicted.

Von Lenk's process of manufacture was patented in England in 1862 and the Prentice Brothers began manufacturing under this process in 1864. In 1865 Abel patented an improvement of the process which was so successful in use that it gave guncotton a prominent and permanent place among explosive substances, and this process is followed to-day. The cotton when treated with the acid is in the fibrous condition which so well characterizes it, and under the microscope these fibres are seen to be hollow so that each is really a capillary or hair-like tube. Von Lenk had shown that cotton contains not only cellulose as the main component of its structure but that there were smaller and variable quantities of other substances naturally present besides foreign bodies accidentally present, and that it was necessary to get the cellulose in a pure and dry condition before treating it with acid. He, too, with others, had proved that the purity, strength and proportions of the acids used and the time and temperature of immersion of the cotton in the acid mixture affected very materially the character of the substance produced, while it was essential that every trace of free acid should be removed from the product, since a most minute quantity of sulphuric acid acts continuously and cumulatively on the guncotton and causes a progressively increasing rate of decomposition. Yet von Lenk and all others up to this time produced the guncotton in the same long staple form as the cotton from which it was made. It was evident to Abel's mind that as the dry cotton was immersed in the acid mixture the capillary tubes, of which it was composed, would suck up the liquid acid and retain it with such force and in such a manner as to make its removal by wringing, or washing with or in water or by neutralization with alkalies, extremely difficult and uncertain, and to remedy this Abel proposed to pulp the guncotton through which the fibres would be cut into such short lengths that the acids could be completely and readily removed from the interiors of the tubes while furthermore this pulped material could by molding and pressure be shaped into any desired forms and dimensions.

Abel's process for the manufacture of military guncotton was as follows: The cotton used was what is known as «cop» or weaver's waste, which is the tangled clippings from the spinning room of a cotton mill; the thready form of this material being preferred to the fluffy form of the unworked cotton. This was first hand-picked to remove the larger foreign bodies present and to open out after baling. It was then boiled in 200-pound lots in caustic soda solution to remove grease, oils and the incrusting substances on the fibres, then wrung out in a centrifugal wringer and dried in a heated closet. It was then put through a cotton picker to open up the fibre and remove foreign bodies which had been overlooked in the hand-picking, and was then dried in a second closet at 225° F. until it contained not over one half per cent of moisture, when it was stored in small lots in hermetically sealed metal vessels to cool. It was then dipped in lots of one pound each in 150 pounds of acids, consisting of one part by weight of nitric acid, 1.5 specific gravity, to three parts by weight of sulphuric acid, 1.845 specific gravity, contained in a large iron trough about which cold water circulated so as to maintain a temperature of 70° F. throughout the dipping. The cotton was plunged rapidly under the acid, allowed to remain immersed for 10 minutes, removed to a shelf above the acid dipping trough, where it was squeezed to remove the excess of acid, and then at once transferred to a two-gallon crock made of acid-proof earthenware. As transferred to this digestion crock the cotton carried with it from 10 to 12 pounds of the acid mixture, and by pressing the mass down in the crock with an iron tool, the cotton was forced to the bottom and covered with a layer of the acid mixture which was squeezed from it. The crock was then covered and placed in a wooden trough where it was partly surrounded with cool water, which was kept in constant circulation, and where it was allowed to remain, so that the cotton could «digest» the acid, for 24 hours. Then the contents were thrown into a steel centrifugal wringer by which the greater part of the acid was removed. The guncotton was then thrown into a tub holding 800 gallons of water through which a large stream of water was continually flowing and in which a large paddle-wheel was in revolution so as to very quickly bring the acid guncotton into contact with so large a volume of cold water as to prevent its becoming heated. The guncotton was then boiled twice for eight hours each in a diluted solution of soda, wrung out and washed with fresh water and put in the pulper. This was an ordinary «beater,» «rag-engine,» or «Hollander,» such as is used in the paper-making industry, and the guncotton, suspended in water, was subjected to the action of the machine for two days in charges of from 300 to 350 pounds, where, by the shearing action of the knives, the fibres were cut into short lengths and the guncotton was reduced to the fineness of cornmeal, and mixed into a pulp with the water present. This was drawn into a large tank, known as the poacher, where the powdered guncotton was allowed to settle and the supernatant water drawn off. Fresh water was added and, by means of a revolving paddle in the poacher, the guncotton was mixed with it and washed by it, and this washing was repeated six or seven times until the chemical test of a sample showed that the acid had been completely removed. Then it was treated with a solution of lime containing a small quantity of caustic soda and also of precipitated chalk, and the mass was ready for molding.

The pot nitration system devised by von Lenk and developed by Abel, as described above, has now been replaced (1) by the centrifugal method wherein the nitration is carried on in large iron centrifuges so that after the «digestion» has gone on for a sufficient time the major part of the «spent» acid is run off and the residue, down to 1½ parts for every part of cotton, is wrung out by the rotation of the centrifuge, and (2) by the Nathan and Thomson displacement process which makes use of shallow earthenware pans, set on pedestals, and provided with pipes through which to introduce the nitrating acids and remove the spent acids. The bottoms of the pans are conical and these bottoms are covered with removable perforated plates, the nitrating acid is then run in, the dried cotton dipped into it, and when the entire charge has been dipped it is covered with a perforated plate, whose upper surface is then slowly covered with cool water. "Digestion" is then allowed to proceed for the desired length of time and when completed, the waste acid cocks below the pans are opened to drain off the "spent" acid and cold water is at the same time run in through the top plates to displace the last of the acid and wash the guncotton.

As shown above the first use to which guncotton was put was as a propellent in guns, and Abel devised means for making powder grains from the pulped guncotton, but he soon pointed out the advantages which it possessed, when compressed, for use in military and naval mines and torpedoes and for engineering operations in times of war, and these are the chief uses to which it has been put. To compress it the alkaline solution from the poacher, containing the finely divided guncotton in suspension, was pumped up to a stuff-chest, which is a cylindrical tank containing a vertical shaft armed with paddle-blades which, by revolving, keeps the guncotton in suspension. From here, by means of a wagon, the pulp was run into a hydraulic press where it was subjected to a pressure of 100 pounds to the square inch and thereby molded into blocks. These blocks were then transferred to another press where they were subjected to a pressure of from 6,000 to 6,800 pounds to the square inch. As made at the United States naval torpedo stations the blocks from the molding press were prismatic, with the vertical edges chamfered, 2.8 inches in diameter by 5¼ to 5½ inches high, with a circular hole ½ inch in diameter, produced by a mandrel in the press, running vertically through the centre of the prism. After final pressing the blocks were 2.9 inches in diameter by 2 inches high, the hole remaining practically unchanged, and they still contained from 12 to 16 per cent of water, though as sent out into the service as "wet guncotton" they were soaked in water until they contained 35 per cent. In the final press by means of steel dies, inscriptions in letters and figures, such as the place and date of manufacture and factory lot, were placed upon each block.

In the fibrous condition guncotton appears like the cotton from which it is made, but it has a harsher feel and it becomes electrified by friction when dry. When dry if rubbed in the dark it becomes phosphorescent. Under the miscroscope by polarized light it exhibits colors, while cotton is colorless. Pure guncotton is without order or taste and is insoluble in water. The gravimetric density before pulping is 0.1, after pulping 0.3, and after compression from 1.0 to 1.3, but by excessive pressure it has been raised to 1.4. The real specific gravity of guncotton is 1.5. When dry, compressed guncotton is detonated by inserting a detonator in the hole in the block and firing it. Wet guncotton is detonated by the detonation of a block of dry guncotton fired in contact with it. The violence of the explosion of guncotton when thus detonated is comparable with, if not superior to, that of nitroglycerin. Dry guncotton may be set on fire and, when compressed, it burns so slowly in the open that the fire may be extinguished by pouring water upon it. Wet guncotton, thoroughly saturated with water, can be shaped by a tool without taking fire or exploding. In forming the cylindrical and conical charges for the torpedoes thrown from the pneumatic guns of the United States steamship Vesuvius at Santiago, the prismatic blocks above described were sawn with a band saw, turned in a lathe and cut with chisels as wood is treated, but care was used to keep the blocks and dust wet throughout the process.

Pure cotton is composed of cellulose having a formula which chemists believe to be some multiple of $C_6H_{10}O_5$. When it is acted upon by nitric acid or mixtures of nitric with sulphuric acid, under the proper conditions, cellulose nitrates are produced through, it is believed, the replacement of hydrogen atoms in the molecule by NO_2 groups, thus forming esters or organic salts. Views differ as to the number of cellulose nitrates existing but, following Vieille, who is the most widely accepted authority on this point, taking the formula of cellulose as $C_{24}H_{40}O_{20}$ we may have the following:

CELLULOSE NITRATES	Per cent of nitrogen	Weight obtained from 100 parts of cellulose
Cellulose endecanitrate	13.47	176.4
Cellulose decanitrate	12.75	169.4
Cellulose enneanitrate	11.96	162.5
Cellulose octonitrate	11.11	155.7
Cellulose heptanitrate	10.18	148.6
Cellulose hexanitrate	9.15	141.7
Cellulose pentanitrate	8.02	134.7
Cellulose tetranitrate	6.76	127.8

There are probably existing also isomers of many of the nitrates given in the table. Following their differences in composition these different cellulose nitrates have different properties especially as regards their solubility in organic solvents. Thus all except the endecanitrate, if properly made, are soluble at ordinary temperatures in a mixture of one volume of alcohol and two volumes of ether. Such cellulose nitrates are called *pyroxyline, nitrocotton, soluble guncotton,* and *collodion cotton* or *guncotton.* The decanitrate is also called *pyrocellulose.* All the cellulose nitrates are by some called *nitrocellulose.* The material produced by the Abel process described above is partly soluble, but mostly insoluble in the ether-alcohol mixture, and to this material the name *guncotton* or better *military guncotton* is applied. In addition to guncotton, the cellulose nitrates are used in the manufacture of smokeless powder, explosive gelatine, pyroxylin plastics, pyroxylin varnishes, photographic films and collodion. For smokeless powders and explosive gelatine the deca- and enneanitrates are most largely used. For varnishes, collodion and photographic films the octonitrate is generally employed. And the heptanitrate, which is of low nitration, is preferred for the pyroxylin plastics. This last nitrate may be made by dipping one pound of pure dry cotton or tissue paper in 100 pounds of a mixture of 66 parts of sulphuric acid, 17 parts of nitric acid and 17 parts of water, and continuing the immersion at 30° C. for 20 to 30 minutes. The acid is then wrung out and the nitrate washed and neutralized. The higher nitrates are made by using stronger acids, longer exposures and higher temperatures. In making pyroxyline varnishes, which are largely used in coating metals, artificial leather and in waterproofing, the pyroxylin is dissolved in ethyl acetate, amyl acetate and similar organic solvents.

Collodion, which is used in surgery, is made by placing 30 grams of pyroxylin in a suitable bottle, pouring upon it 750 cubic centimetres of ether, corking the bottle and allowing the whole to stand 15 minutes. Two hundred and fifty cubic centimetres of alcohol are then added and the bottle shaken until the pyroxylin is dissolved. On allowing to stand the solution becomes clear, and if poured upon a flesh wound the solvents evaporate and a continuous film of pyroxylin is formed which protects the wound from the air and which also, by contracting as it dries, brings the edges of the wound together. Substances such as cantharides, tannic acid and the like, by which to produce blistering, styptic and other effects, may be added to the collodion. See EXPLOSIVES.

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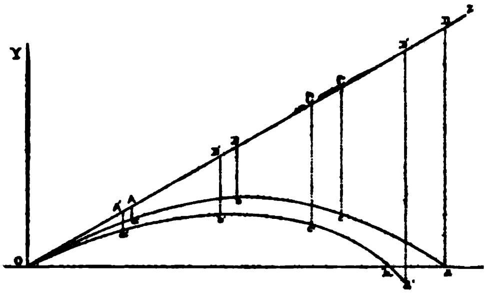
GUNDULICH, Ivan, goon'doo-litch, ē-van', Illyrian poet: b. Ragusa, 1588; d. 1638. As son of a nobleman his education was most carefully conducted from the earliest childhood by Jesuits and humanists. Later he studied jurisprudence and became president of the Ragusan Republic. As a very young man he became acquainted with Italian and Latin literatures and started his literary career with a good translation in Croatian of Tasso's 'Gerusalemme Liberata,' Preti's 'L'amante timido' and other works. He also wrote original lyric verses imitating slavishly his Italian masters, but his remarkable and original poem in three long cantos, 'The Tears of the Prodigal Son,' attracted general attention. He wrote also several dramas of which 'Dubravka' is by far the best. But his fame in Slav literature is due mostly to his masterpiece 'Osman,' a heroic epic poem in 20 cantos, of which two have been lost. It is a glorification of the triumph of the Cross over the Crescent, the story of which is founded on the battle at Khotin (1621) won from the Turks by the Polish King Vladislav in which Sultan Osman perished. The poem excels in beauty of language, harmony, wealth of rhyme, variety of meter, picturesque descriptions of battlefields and depth of psychologic analysis. It was first published in 1826 and since then has been frequently issued. The Serbians, Croatians and Slovenians see in 'Osman' a prophecy of the complete emancipation of the Christians from the Ottoman yoke. The lyric part of the poem is undoubtedly the most remarkable production in South Slavic literature. In 1893 a magnificent monument was erected by the Ragusans in the centre of the poet's native town. There are several editions of his works, the most complete of which is that produced by the South-Slav Academy of Science and Arts ('Stari pisci hrvatski,' Vol. IX). Consult Appendini, 'Vita di G. Condola' (Gundulich) (Ragusa 1828); Jansen, 'Gundulich' (Göteborg 1900); Makowcj, 'Beiträge zu den Quellen des 'Osman'' (in *Archiv für slavische Philologie*, Vol. XXVI, Brunswick 1904).

GUNN, Mrs. Æneas (JENNIE GUNN), Australian author: b. Melbourne, 5 June 1879. She was educated at the University of Melbourne. In 1901 she married A. J. Gunn, after having taught school for three years, and went with him to the Northern Territory where they resided at the Elsey Cattle Station until the death of her husband there in 1903. She returned to Melbourne and began literary work with the 'Little Black Princess' in 1905. This story deals with the life in the Elsey Station and treats entertainingly of the manners and customs of the natives. This and 'We of the Never Never' abound in pathos and humor offset with rich local color. There is little pretense of plot in these stories but the mastery of detail they show and the ability to march the characters and events hand in hand make Mrs. Gunn's work well worth while.

GUNN, Æneas James, Australian writer: b. in Australia; d. in the Northern Territory, March 1903. He was the son of the Rev. Peter Gunn, first Gælic minister in Melbourne. He was well known in Melbourne as a versatile writer and a contributor to magazines and newspapers. In 1901 he married and moved to Elsey Cattle Station in the Northern Territory where he died two years later. While there he wrote descriptive sketches for the Melbourne papers; and these gave his wife the idea which made her, a few years later, under the name of Jennie Gunn, one of the most popular writers of Australia.

GUNNER'S QUADRANT, an instrument at present used only as a test for artillery sights, but formerly employed by artillery officers to determine the elevation or depression of a gun or mortar. It is made of a graduated quarter of a circle of sheet-brass, with a radius of six inches, fastened to a 22-inch straight brass bar. A spirit-level is attached to an arm at its middle and the movable end is fitted with a clamp-screw.

GUNNERY is the science and art of handling guns, the object being to inflict the maximum destructive effect upon the enemy in *personnel, material* and *morale* (i.e., troops and ship's crews; protective works, ships, guns, war materials and supplies; and mental condition as regards zeal, energy, hopeful and confident combativeness, etc.). It consists of interior and exterior ballistics, gun strategy and tactics and the training of officers and men by means of instruction, drill and target practice. *Interior ballistics* are concerned with the developments within the bore of the gun; *exterior ballistics,* with the behavior of the projectile after it leaves the gun. *Gun strategy* defines what should be done to secure the best results. *Gun tactics* are the methods of carrying out *gun strategy.* The scientific study of interior ballistics has for its ultimate object the development of the highest practicable muzzle velocity in a gun which fires a projectile of the greatest practicable weight (for the calibre of gun) and largest practicable bursting charge. It investigates the problem of attaining these ends without undue strain on the gun, without undue weight of gun, etc. Exterior ballistics follow the projectile from the muzzle of the gun to its point of rest or explosion, examining the velocity and trajectory of the projectile and the forces which produce changes in either. We thus endeavor to solve the problem of where and when a projectile of a given size, shape, weight and velocity of translation and rotation will strike under the action of the forces which effect its movement. Interior ballistics show that a high velocity requires high initial gas pressure in the gun and the maintenance of as high a pressure as practicable for the greatest practicable distance in the bore. The limitations imposed by the present state of powder and gun development are, among others, an initial pressure of about 16 tons per square inch, a length of (heavy) gun of about 50 calibres, and a powder gas which is not unduly erosive. Higher pressures could be used, but with existing powders the increased amount of heat and erosion thereby produced would be inadmissible. Longer guns can be built; but after reaching 50 calibres the increase of accelerating force due to additional length is so small and the growth in weight (required to give necessary stiffness and accuracy) is so rapid that greater efficiency is obtained by employing the same weight in building a gun of larger calibre and less relative length. The present high velocities have been rendered possible by the use of slow-burning powders which are not entirely turned into gas until after the projectile has moved some distance from its seat. The maximum pressure is thus kept down and the sustained pressure augmented. In howitzers and mortars, velocity and range are sacrificed to obtain a large calibre extra-heavy projectile with a very light gun.



Were it not for the force of gravity and the various effects of the air, a projectile would, upon leaving the muzzle of a gun, proceed with a uniform velocity in a straight line. In the sketch, let OZ be that line. The projectile reaches A in one second, B in two seconds, C in three and D in four, if OA=AB=BC=CD. If the projectile were fired in a vacuum where it was acted upon by the force of gravity but by no other disturbing forces, it would at the end of one second be at *a* instead of A, A*a* being 16.08 feet, the distance an object will fall in one second under the influence of gravity. At the end of two seconds it would be at *b*, in three seconds at *c* and in four seconds at *d*. The curve O*abcd* is a parabola with the axis vertical. If the firing takes place in air in the ordinary way the path of the projectile (i.e., its trajectory) will be still further modified. Instead of having a constant velocity and reaching A, B, C, etc., the velocity is steadily decreasing so that at the end of one second (if gravity did not act) it would only reach some point A'; at the end of two seconds, B', etc. Gravity drops it to *a' b'*, etc., in which A*a*=A'*a'*=B'*b*—B'*b'*, etc. The curve O*a'b'c'hd'* is the trajectory in air, the point *d'* being imaginary. The following table gives a comparison of the ranges in air and the theoretical ranges in a vacuum where the velocity of the projectile, measured in a direction parallel to the axis of the gun, remains constant. The muzzle velocity in all cases is 1,700 feet per second.

ANGLE OF ELEVATION.	Striking velocity in air, feet.	Range in air, yards.	Range in vacuo, yards.
1° 04′	1,531	1,000	1,115
2° 15′	1,383	2,000	2,350
3° 35′	1,258	3,000	3,737
5° 04′	1,161	4,000	5,277
6° 50′	1,087	5,000	7,007
8° 42′	1,028	6,000	8,975

In addition to checking the velocity of the projectile by direct pressure and friction, the air acts upon it in other ways. It tends to move it in the direction in which the air currents are moving and, in conjunction with the rotation of the projectile, causes a certain amount of deflection due to gyroscopic action which is called *drift*. As this gyroscopic action is almost exactly constant for any particular gun and velocity of projectile it results in an angular error which is allowed for in primary adjustment of the gun-sights. This is effected by inclining the rear bar-sight to the left or inclining the axis of the telescope sight. Other irregular lateral deflections or errors are corrected by a sliding leaf on the rear sight bar, or on the telescope bar or setting device. Vertical or range errors are corrected by increasing or decreasing the angle of elevation. Gun-fire is commonly divided into two classes, *direct* and *high-angle*. In *direct* fire the elevation is small, the trajectory very slightly curved, and the projectile strikes from a lateral direction. This is the ordinary method of shooting. In *high-angle* fire, advantage is taken of the fact that, with a given muzzle velocity, a projectile will have its greatest range when the gun is elevated at an angle of slightly more than 45 degrees above the horizontal. This enables a short gun to fire a heavy projectile at a low velocity to a comparatively long distance. The range may be varied by changing the elevation or the weight of the charge. *High-powered* guns (muzzle velocity 2,500 feet per second or greater) are usually fired at angles of elevation of less than 15 degrees, but greater elevations are beginning to be common. The term *curved* fire is sometimes applied to firing at angles between 15 degrees and 30 degrees and *high-angle* fire to elevations of 30 degrees or above. To render a gun effective, it must possess (a) safety, (b) accuracy, (c) destructive power, (d) adequate speed of fire. Absolute safety is impossible, but accidents should be rare and only of the kind that it is impossible to wholly provide against. A reputation of unsafeness tends to demoralize the men who handle the gun. The greatest sources of danger in a modern gun are (a) premature explosion of the charge, (b) explosion of the projectile in the bore, (c) jamming of the projectile in the bore, (d) hang-fire, (e) weakness of breech mechanism. Accuracy is of course imperative, as an inaccurate gun is useless except at very short range. In a field gun the principal causes of inaccuracy are: (1) variations in the angle of sight, (2) drift (due to gyroscopic action of the projectile), (3) wind, (4) jump, (5) axis of trunnions not horizontal, (6) variations in the velocity of the projectile due to inequalities of powder, (7) error in supposed range, (8) personal errors of the gun-pointer, (9) varying conditions of the atmosphere as regards height of barometer, temperature, heat-waves, hygrometric conditions, (10) effect of strong or defective light on the sights or on the objective. Guns mounted on board ship are affected by these causes and by (11) horizontal movement of the ship and of the enemy — changes of course and speed, and (12) rolling and pitching of the ship. Field guns are frequently directed at targets beyond intervening objects and in that case they have difficulty in (13) pointing in the correct direction, and (14) a jarring of the sights by the shock of discharge which may throw them temporarily out of adjustment. The combined effect of these errors may be considerable. Some of them permit of partial independent correction. The total remaining error is overcome by observing the fall of the projectiles. On board ship, this is effected by *spotters* at the masthead; on shore, by range observers in kite-balloons or airplanes. The sights are readjusted by the information so derived and this readjustment is made as often as necessary. In order to make *spotting* easier and more certain the guns on large ships are fired in *salvos* (usually half or all of the guns which will bear). Observation of the fall of projectiles on land is usually more difficult than at sea except by the forces which have command of the air, or are strongest in the air. Whichever side has a marked superiority in air power possesses a great advantage in fire control and gun efficiency.

Fire control includes the direction, range, grouping and speed of fire; the selection of the target, of the guns to be used, when they are to be used; and control of the character of the ammunition employed. The chief *fire-control* officer of a ship is in constant communication with the captain; the chief fire-control officer of a group of guns or batteries on shore keeps in close touch with the commanding officer of the group, as changes in target or character of fire are of frequent occurrence — shifts from ordinary shell to gas shell and then to shrapnel being sometimes made in a single minute. Each subdivision of a group of guns, if likely to be assigned a separate target or different ammunition, or if the guns of the subdivision are of a different calibre or type, or at some distance from the rest of the group, must have its own fire-control officer, who gets general instructions from the chief fire control. Small-arm fire from muskets or machine guns is usually controlled by the commanding officer of the infantry unit to which they belong or near which they are located. The present character and arrangement of the battery of recent battleships is based upon the fundamental principle of strategy which requires the greatest concentration of gun-power in the least practicable space, but the reform was largely brought about by tactical difficulties connected with the fire-control of guns of several calibres. These difficulties are too complex for full description here but were connected with the fact that guns of different calibres have different maximum ranges, different danger spaces at practically all ranges, and must often be directed at different targets. This involved a serious complication in fire control. The strategical arguments for the all-big-gun battleship backed by tactical ones forced the adoption of the principle. Since the maximum weight of fire can only be obtained on the broadside, the fullest development of broadside fire led to placing all turrets on the central fore-and-aft line, while good bow-fire and stern-fire were obtained by raising two turrets so they could fire over others. The difficulties of fire control were thus reduced to their lowest terms while the gun-power of the ship was enormously increased. Another strategic gain was the augmented gun-power of the line of battle of the fleet for each thousand yards of its length, in ships of recent type, the gun-power per thousand yards of the line of battle is 500 per cent greater than for ships of the *Connecticut* class and is accompanied with an increase of speed of more than four knots, much greater range of guns, superior accuracy at all ranges beyond a few thousand yards and enormously greater destructive effect of the projectiles.

In land operations, artillery fire is designed to: (a) check the enemy's advance by (1) interposing a barrage or curtain of fire between his front and his objective or by (2) fire directed at his advancing troops; (b) prevent the advancing of the enemy's reinforcements by interposing a barrage between his fighting line and his reserves or supporting troops; (c) destroy the enemy's stores or interrupt his supplies; (d) destroy his field works, trenches and gun-emplacements or render them untenable or useless; (e) clear the ground of the enemy's obstructions in preparation for advance or assault; (f) to lower the morale or resisting power of the enemy by very heavy bombardment, use of gas, etc.; (g) to deceive the enemy as to the true objective but incidentally to inflict all possible damage.

While field guns of about 3-inch calibre have the widest range of usefulness in attack and defense, large guns (up to 12-inch calibre) of great power and long range are often of great service, and heavy howitzers (up to 20-inch, but especially of 8- to 12-inch) are indispensable. Concealment of the positions of heavy guns is more important than any form of protection and where practicable they are freequently moved, some being placed on railway cars. Concealment from airplane observation is sought by covering with brush or light unnoticeable screens, or by painting the gun and mount in a way to render its identification difficult.

Trench mortars are very light pieces designed to throw heavy charges (25 to 200 pounds) of high explosive a distance of a few hundred feet and are very useful when the enemy's trenches and other works are near your own. Most trench mortars are of three- or four-inch calibre but a few are much larger. The propulsive force is compressed air or a small charge of powder. In place of these mortars, simple catapults, with long arms operated by compressing some sort of spring, have been used with considerable success at very short distances. To obtain high efficiency of operation, the gun-layers, gun-pointers, sight-setters, trainers and all other men attached to a gun or battery must be highly trained. Those who sight the guns must have a preliminary training of months to get the best results. And only a few men have the keenness of vision, steadiness of nerve and quickness of decision, which are required for gun-pointers of the first class. The character of the work required in the army and the navy is very different, that of naval gun-layers being much more difficult, because the gun itself is on a moving platform which rolls and pitches. This makes it necessary to have two men, one (the trainer) who trains the piece and keeps it in the vertical plane of the target and one (the pointer) who elevates the gun and fires. A third man (the sight-setter) keeps the angle of elevation (between the line of sight and the axis of the bore) adjusted in accordance with instructions. Gun-pointers are trained by a progressive system which begins with aiming a gun at a very small point. The next step is the use of an instrument which records the point aimed at. This is followed by sub-calibre practice in which a piece of small calibre is clamped to the large gun. The sights of the large gun are used but it is the small one which is fired. Sub-calibre practice lends itself to many variations, the methods in use in different navies and armies being alike only in principle. Full-calibre target practice follows sub-calibre work and battle-practice (in which the conditions of battle are simulated) complete the training. Hardly less important than the foregoing is the training of the ammunition supply details; in modern field fighting, upon a thorough organization and efficiency of the supply train depends the winning or losing of the battle. See articles on GUNS; BALLISTICS; PROJECTILES, etc.

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GUNNISON, John W., American army officer and explorer: b. Goshen, N. H., 11 Nov. 1812; d. near Sevier Lake, Utah, 26 Oct. 1853. Attended an academy at Hopkinton, N. H., finishing his course in December 1832. On 7 July 1838 he was graduated from the United States Military Academy and became second lieutenant, Second Artillery, topographical engineer; he was made first lieutenant 9 July 1848; and captain 3 March 1853. He served in the Florida War of 1837–38 as ordnance officer. He was with the Cherokee Nation 1838, while transferring the Indians to the West, and on improvement of Savannah and Saint Mary's rivers, Georgia, 1840–41; on survey of Lake Michigan, 1841–42, and of Northwestern lakes, 1842–49. He was engaged for nearly 10 years in surveying the Northwestern lakes and in the improvement of harbors, and in 1849–51 was associated with Capt. Howard Stansbury in making maps of the Great Salt Lake region, drawing up an able report on his work; was engaged in 1846, on exploration of Utah and 1849–51 in a survey of Great Salt Lake, Utah; in 1851–53 survey of Northwestern lakes. In 1853, he had charge of the expedition and survey of the central route for a railway from the Mississippi River to the Pacific. On 3 March 1853, he was appointed captain of topographical engineers for 14 years of continuous service. While engaged in the last-named survey he was killed 26 Oct. 1853, near Sevier Lake, Utah, with seven of his exploring party by a band of Mormons and Paiute Indians. This was the first corps of engineers sent by the government to explore the route for Pacific railroads. The scheme was considered visionary at first, then possible and finally accomplished, the benefits being nation wide.

GUNNISON, Royal Arch, judge: b. Binghamton, N. Y., 24 June 1873. He was graduated from the Binghamton Central High School and from the law department of Cornell University. After admission to the New York bar in 1897 he became a United States referee in bankruptcy for Broome, Chenango and Delaware counties, 1898–1904, and United States district judge, first division of the District of Alaska, 1904–09. He has engaged in the private practice of law at Juneau since 1909 and non-resident lecturer on bankruptcy at the Cornell College of Law since 1901. Besides his membership in the New York State Bar Association, he was secretary-treasurer of the National Association of United States Referees on Bankruptcy during the years 1900–05.

GUNNISON, a river of Colorado formed at Altamont by the junction of the Taylor and East rivers, flows southwesterly to Gunnison, near Cimarron, enters the Grand Cañon of the Gunnison 15 miles long and continuing in a northwesterly direction past Delta, unites with the Grand River at Grand Junction after a course of nearly 200 miles. See UNCOMPHRAGRE VALLEY PROJECT.

GUNNY, a jute (see JUTE) cloth, also a bag or sack. Gunny-bags are very largely exported from India to various parts of the world. American cotton is largely packed in these. They can be manufactured at a low price, hence the great demand for them. The name gunny is applied to the cloth as well as to the made-up bags. About 1850 the peasant hand-looms of Lower Bengal met both the home and the foreign demand for Indian-made gunny-bags — indeed the making of these was then the great domestic industry of that portion of India. At the present time the number made at the great steam-factories, of which there are now 23 in India, far exceeds what is produced by hand-looms. For example, in one year 82,779,207 gunny-bags were exported from India, of which only 5,000,000 were woven by hand.

GUNPOWDER, an explosive substance formed by mixing saltpeter, charcoal and sulphur together. The mixture may vary in composition between quite wide limits and yet possess explosive properties; but the proportions adopted by the United States governmental authorities are saltpeter, 75 per cent; charcoal, 15 per cent, and sulphur, 10 per cent. The saltpeter used is the India saltpeter or nitre, which is known to chemists as potassium nitrate, and although found native as an incrustation on the soil in India it is to-day largely made from Chile saltpeter, or sodium nitrate, by reacting on the latter with potassium nitrate. It is carefully purified, finely ground and thoroughly dried for use, in the manufacture of gunpowder. The charcoal most suitable for gunpowder is that variety which is mostly readily ignited, most quickly burned and gives the least quantity of ash. Such charcoal is produced from dogwood, willow or alder, by heating the air-dried woods in closed iron cylinders or retorts out of contact with air so that they undergo destructive distillation and leave the charcoal as a residue, this method of manufacture having been invented in England by Bishop Landloff and adopted in that country in 1797. The dogwood, which is really the alder-buckthorn, *Rhamnus Frangula,* is cut when one inch in diameter; the willow and alder when four inches; though these dimensions vary in practice. The wood is cut in the spring when in full sap, stripped of its bark and seasoned by an exposure of two to three years; the dogwood being stacked under shelter, but the other woods in the open so that the rain may wash the sap from the wood and the sun's rays and the air may destroy the spiral cells. The charring is effected by fires outside the retorts or by passing superheated steam or hot carbon dioxide gas through the retorts. The character and yield of the charcoal produced varies with the temperature to which the wood is exposed and the time of exposure. When the wood is heated to 290° C. red charcoal is formed; when heated to 350° C. or above, black charcoal is produced. When the heating is done quickly the yield of charcoal is much larger than when the heating is slow. Red charcoal is much more easily ignited and burns faster than black charcoal. Charcoal for the manufacture of gunpowder is ground to a fine powder by rotation in a drum with a quantity of brass or bronze balls. Sulphur of commerce is purified for use in this manufacture by fusion and distillation; being eventually obtained in the form of roll brimstone, which is then crushed to a fine powder by heavy rollers. It must be free from sulphuric and sulphurous acids, as well as solid impurities, and should consist entirely of that modification of sulphur which is completely soluble in carbon disulphide.

The dry, finely ground and sifted saltpeter, charcoal and sulphur are weighed into the mixing machine, which consists of a gun-metal drum arranged to make 40 revolutions a minute and provided with hollow bearings through which a shaft is passed which carries 44 arms or fliers of such length as to just clear the interior surface of the drum. This shaft revolves in an opposite direction to and with twice the speed of the drum. After the ingredients are put in the drum the mixing is carried on for five minutes and then the mixture goes to the incorporating or wheel mill. The process of incorporation is of the greatest importance in this manufacture. It consists in the long continued grinding together of the ingredients in order to mix them so intimately that the product appears to the naked eye as a homogeneous mass, for, unless this be done, complete reaction between the components of the powder by combustion cannot be expected. The finished gunpowder depends for its excellence largely upon the completeness and thoroughness of the incorporation. The incorporating mill consists of a circular bed of iron or stone on which the mixture is placed. A vertical shaft rising through the centre of this bed carries a horizontal one, on the two ends of which heavy stone or iron wheels, called edge runners, are hung. These wheels rotate about the horizontal shaft and, as the vertical shaft revolves, they travel at the same time in a circle around the bed so that, at the points on the bed where the edge runners touch, the motions of rotation and translation are converted into a twisting motion, like that of a muller, and the material beneath is thus overturned and very intimately mixed. The edge runners weight from three to seven tons, are from four to seven feet in diameter and are so movable on the spindle that they can accommodate themselves to varying thicknesses of powder on the bed. One of the edge runners is a little nearer the vertical shaft than the other, so that they travel in different paths and they are followed by a scraper which throws toward the centre of the bed the material that has been forced to the exterior by the edge runners. To incorporate, 50 pounds of the mixture are spread out on the mill-bed and slightly moistened and the wheels are set in motion. If the wheels are of stone weighing 3½ tons and making 7½ revolutions per minute, the incorporation is completed in 3½ hours. If the wheels are of iron weighing four tons and making eight revolutions per minute, 2½ hours are required for cannon powder. The operator does not remain constantly in the mill, but goes in occasionally to wet the charge, from 2 to 10 pints of water being used in accordance with the weather. The chief danger from accidental explosions during the manufacture of gunpowder is found in the incorporating mills; fortunately there is less explosive material here at any time than there is at any other part of the works. To render the damage done by an explosion as slight as possible, the buildings in which these operations are conducted are built with a strong framework covered with light boards, or else with three sides of stone and the fourth and roof of light wood, so that when an explosion occurs the framework or the stone walls remain. These mills are usually built in groups, and to prevent an explosion in one being communicated to the others, each is provided with a drenching apparatus which automatically wets and protects the charges in the mills adjacent to the one which is blown up. The communication of fire or explosion is also arrested by means of barricades built about the mills which consist of masonry filled with earth, or simple earth mounds or sometimes wooden structures built in the shape of a letter A.

When the incorporation is completed the mill cake, as the mixture is now called, is removed from the bed and runners by means of a copper chisel and wooden mallet. It is partly in the form of a compact cake and partly fine meal and in this condition it is put into the press. This is a powerful hydraulic press with a rectangular box which is divided into compartments of the desired width by means of copper or gun-metal plates. When the spaces between the plates have been filled with mill cake, pressure is applied which causes the particles to cohere, and the gunpowder is taken from the press in sheets having an area equal to that of the plates and a thickness dependent on the width of the filling space, the amount of the pressure applied and the duration of its application. Sometimes the press plates are corrugated like waffle irons, as for instance, in the manufacture of waffle and of hexagonal powders, and sometimes they are replaced by a press block filled with molds in each of which a separate grain is pressed, as in the manufacture of cocoa or prismatic powder. The operation of pressing is a most important one, since the density of the finished powder depends upon it and, as it is markedly affected by even slight changes in atmospheric conditions, it is a very nice one.

The press cake passes to the corning or granulating machine, where it is cut into grains. This machine consists of a hopper into which the charge is fed, an elevating band, an endless revolving table, four pairs of rollers and several sets of screens for sorting the grains according to size into boxes placed to receive each different size. The rollers, which are of gun-metal, are corrugated or provided with teeth, the upper two being coarser than the lower, and they are adjusted to the size of grain required. When the hopper has been emptied a clutch is relieved which stops the machine and at the same time rings a bell which notifies the operator of the fact for, as the machine is self-feeding, the workmen are not obliged to be present while it is at work. The grains are now freed from dust by passing through horizontal cylindrical sieves such as are used in flour-mills and they are then glazed by rotation in wooden barrels where, by the friction of the grains against each other, their angles are rounded off and a hard polished surface is imparted to them whereby they become better able to bear transportation and are less likely to absorb moisture. Sometimes the grains are coated with graphite which is put in the glazing barrel with them. Though but four ounces of graphite are used to 1,200 pounds of gunpowder it is considered objectionable for use with fine grain regulation powder as it delays ignition and fouls the piece, yet it improves powder to be used in fixed ammunition, in that it enables the grains to readily pack close together. As more dust is formed during the glazing process the grains are again put through the dusting reels and are then exposed for a day in the drying house to a temperature of from 125° to 130° F. The finished powder is packed in 1-pound tins or 25-pound kegs, though other sized packages are produced to some extent. According to the size or form or structure of the grains gunpowder is known as *mealed powder, superfine,* designated by the mark *F.F.G.; fine grain, F.G.; large or coarse grain, L.G.; large grain for rifles, R.L.G.; mammoth, pebble, pellet, cubical, hexagonal, sphere-hexagonal, waffle, Fossano* or *progressive,* and *cocoa* or *brown prismatic powder.* Mealed powder is in the form of dust and is used for driving fuses for ammunition and in pyrotechny. Fossano or progressive powder is formed by pressing mill cake to a density of 1.79, then breaking this press cake into one-eighth to one-quarter inch grains, mixing these grains with a prescribed quantity of fine grain powder, pressing this mixture to a mean density of 1.76 and breaking this press cake into grains about two and one-half inches square by one and three-quarter inches thick. By this means a grain of varying density was obtained which burned progressively. This feature was introduced into powder-making by Prof. R. Ogden Doremus of New York, but was developed in Europe. Cocoa or brown prismatic powder is the final stage of development of the compressed perforated grain invented by General Rodman of the United States army. In experimenting with the 15-inch and 20-inch smooth-bore guns invented by him, General Rodman found that he could reduce the initial pressures, while securing the desired velocities, by using perforated discs of compressed powder which were of a diameter equal to the calibre of the gun and between one and two inches in thickness. He styled this charge a «perforated cake cartridge» and in his ‹Properties of Metals for Cannon and Qualities of Cannon Powder,› published in Boston, Mass., 1861, he mathematically demonstrated that at the beginning such discs presented the minimum of free surface to combustion but as the powder burned there was a constant enlargement of the perforations, whereby the area of surface exposed to combustion was constantly increased and that therefore the volume of evolved gases increased as the volume of the chamber, due to the travel of the projectile, increased, in consequence of which the pressure was more uniformly distributed along the bore than it had been with the granulated powders hitherto employed. Owing to difficulties in manufacture and use, Rodman later found it convenient to build up his charges with perforated hexagonal prisms of comparatively small size. The Civil War prevented the further development of this novel idea in powder-making in this country at that time, but a Russian military commission, which visited the United States during the Civil War, was so impressed by what Rodman had accomplished, that on its recommendation the manufacture was taken up and carried on in Russia on an extensive scale, and it soon spread to other countries. About 1880 Germany adopted cocoa powder, which was a brown prismatic powder with a single canal, the grains having the form of an hexagonal prism, one inch in height by 1.36 inches in diameter and a density of 1.86. This powder, however, differed from ordinary gunpowder both in the kind of charcoal used and in the proportions of the components. The charcoal was underburned or red charcoal made from rye straw, and the composition was saltpeter 80.50 per cent, charcoal 16.00 per cent, sulphur 2.50 per cent and moisture 1 per cent. Cocoa powder was so successful for use in modern high-powered rifle guns that it was sought for by all military nations and the want was met in this country by substituting for the rye straw charcoal red charcoal from wood and carbohydrates, such as sugar, and this brown prismatic powder was used in our modern large calibre guns until displaced by smokeless powder.

Although very great care is exercised in the manufacture of gunpowder, yet there are so many opportunities for variations to occur in each of the many steps of the process that even the best powder-makers cannot regularly produce powder that will always give the same pressure and velocity in the same gun. Since, in order to ensure accuracy of fire, the successive powder charges used must possess the same ballistic properties this result is secured by proving a number of factory runs by firing trials and then mixing these together in the proportions required to produce the desired result. This process is called blending. It was practised by Benvenuto Cellini and has been in vogue ever since.

Good black gunpowder should have a perfectly uniform slate color and it should show no difference in color when crushed. If it is bluish or quite black it contains too much charcoal or is too damp, while the presence of bright points of bluish-white spots indicates that the saltpeter has effloresced. If the powder soils the hand or a sheet of paper when run over them it contains too much moisture or else meal powder. On pressing the powder in the hand it should not crackle or be easily crushed and when crushed the grains should not fall at once to dust, but should first split into angular fragments. Three different densities are determined for gunpowder, each of which furnishes valuable information. These are the gravimetric density which is the weight of a unit volume of powder grains including the air between and enclosed in them; the relative density, which is the weight of a unit volume of powder grains excluding the air between them but including that contained in the pores of the grains; and the absolute specific gravity, which is the weight of the powder exclusive of all air.

Since smokeless gunpowder has been perfected and adopted for use in guns of all calibres it has to a large extent superseded black gunpowder; yet the production of black gunpowder bids fair to continue for many years to come, because in ordnance it is necessary to use a priming charge of it with which to fire the smokeless gunpowder; because smokeless powder cannot be efficiently substituted for black gunpowder in the older forms of small arms that are widely scattered over the country; because black powder is most suitable for use in fuses and in pyrotechny; and because smokeless powder is too expensive and inferior for use in saluting.

Gunpowder was formerly used in blasting as well as for a propellent, but usually a special mixture containing as little as 60 per cent of saltpeter was prepared for this purpose. In 1857 Lamotte Dupont of Wilmington, Del., invented *blasting powder* which differs from gunpowder chiefly in that Chile saltpeter is used in place of India saltpeter. Though crude materials are used and less care is taken the methods pursued for its manufacture are in general similar to those used for gunpowder.

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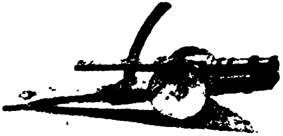
GUNPOWDER PLOT, a famous conspiracy formed in England in 1604 by Robert Catesby, and a small band of other Roman Catholics, who, goaded into excitement by the penal laws directed against their faith and its professors, aimed to blow up the Houses of Parliament by gunpowder 5 Nov. 1605. An anonymous letter of warning, sent to Lord Monteagle, led to the discovery of the plot, and the various conspirators were arrested and executed. Among those put to death was Guy Fawkes, who had been caught on the threshold leading to the vault below the House of Lords with matches ready to fire the train. Since 1605 all places are annually searched at the opening of Parliament. The day was thereafter held as a festival in the Established Church of England up to the reign of Edward VII, the special services for the day annexed to the Prayer Book being then abolished. Consult Gardiner, 'What the Gunpowder Plot Was' (1897); Gerard's contemporary accounts; Jardini, 'Narrative of the Gunpowder Plot' (1857); Jones, M. W., 'The Gunpowder Plot' (1909).

GÜNS, or **KÖSZEG**, kė'sĕg, Hungary, a town in the county of Vas, on the river Güns, 11 miles northwest of Steinamanger, with which it is connected by rail. The principal buildings are the castle of the princes of Eszterházy, with huge fortifications; the church, two convents, a gymnasium and a military school. It became a municipal town in 1328 and a free royal town in 1648. There is trade in flour, fruit and wine. Pop. 8,500.

GUNS, History and Development. The early history of guns is involved in the mists of legend, doubt and conjecture. Their evolution necessarily followed the development of gunpowder from the point of its ascertained capabilities as a propellant. According to reliable testimony, incendiary compositions possessing some explosive force were in use thousands of years before the Christian era. Rockets, using an explosive closely resembling gunpowder, were used by the Chinese 1.000 to 2,000 years B.C.; and others carrying blazing arrows were employed in the time of Alexander the Great. Greek fire, a fiercely burning incendiary composition, was used by the naval vessels of the Eastern Empire from the 7th



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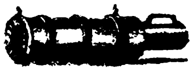


FIG. 10
PRIMATIVE CANNON OF 1554

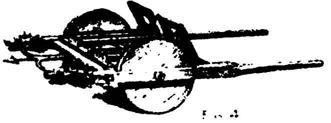


FIG. 4
GROUP OF BOMBARDES
14TH CENTURY

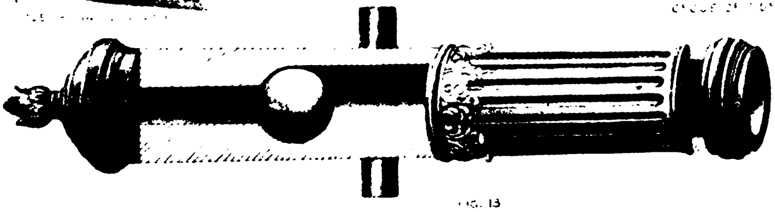


FIG. 13
EARLY 19TH CENTURY
CAST IRON CANNON

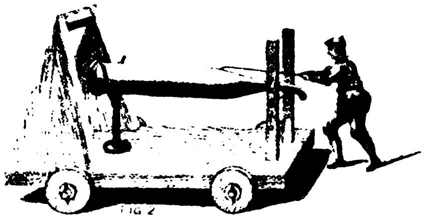


FIG. 2
CERBOTANA AMBULATORIA
14TH CENTURY

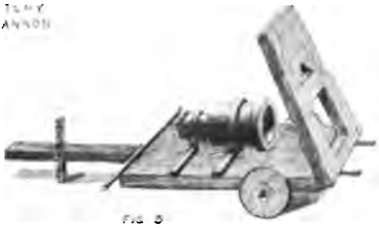


FIG. 5
14TH CENTURY GUN WITH SHIELD

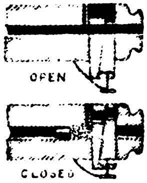


FIG. 8 FIG. 9
PRUSSIAN BREECH LOADING
MECHANISM – 19TH CENTURY

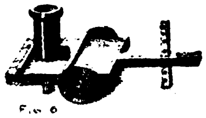


FIG. 6
ELBOWED BOMBARDE
AN EARLY MORTAR

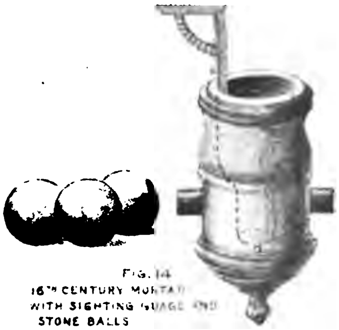


FIG. 14
16TH CENTURY MORTAR
WITH SIGHTING GUAGE AND
STONE BALLS

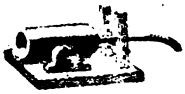


FIG. 1
CERBOTANA OF 14TH CENTURY

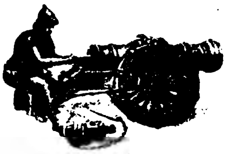


FIG. 7
A GERMAN BREECH LOADER
16TH CENTURY

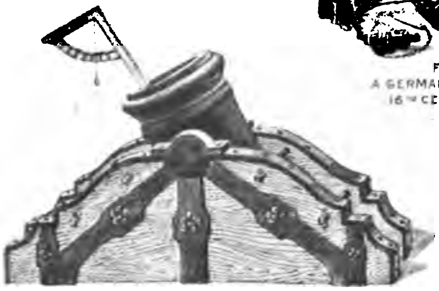


FIG. 15
A TRABUCCHO OR MORTAR OF THE
16TH CENTURY

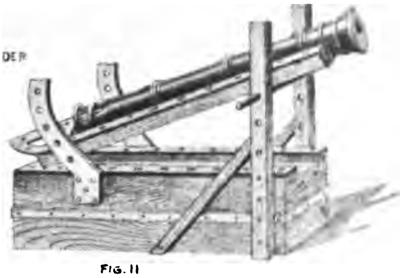


FIG. 11
OLD ITALIAN FIELD PIECE OF THE
15TH CENTURY

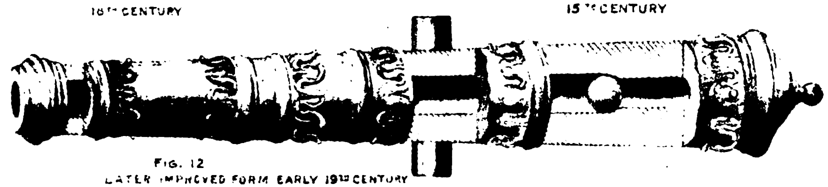


FIG. 12
LATER IMPROVED FORM EARLY 19TH CENTURY

ANCIENT TYPES OF CANNON

century onward and did much to defend it against the Turks and Italian states. Its composition seems to have varied or else the name was often applied to substances which were not justly entitled to the designation. The various compounds passing under the name were composed of pitch, oil, salt, charcoal, sulphur and other substances. The pitch was an inflammable resin; the oil in many cases was undoubtedly crude petroleum or crude naphtha; the salt of the real Greek fire was probably crude nitrate of potash or soda. Sulphur appears as an ingredient in Chinese powder and in some compositions made in Italy, but whether it was an ingredient of genuine Greek fire is uncertain.

In the course of time, as the use of Greek fire became extended and its composition improved, tubes were placed in the bows of the war galleys and the flaming material discharged through them upon the deck of the enemy when the vessels were in contact favorable to this operation. In the later types of tubes at least, the charge was placed in a brass cup or charging piece, resembling a beer stein, which was inserted in the inboard end of the tube. It is a significant fact that the earliest guns (except hand-guns) of which we have cognizance were loaded in the same way, the powder charge being held in a charging-piece of the beer stein pattern. Marcus Græcus, in his work (A.D. 846) entitled 'Incipit Liber Ignium a Marco Graeco prescriptus, cujus virtus et efficacia est ad comburendum hostes, tam in mari, quam in terra,' describes several methods of making and launching fire upon an enemy, among them the following:— one pound of live sulphur, two of charcoal of willow, six of saltpeter, reduced to fine powder in a marble mortar and mixed together; a certain quantity is to be put in a long, narrow and well-compacted cover and then discharged into the air. Apparently, the «cover» is a rocket tube. There is a receipt for gunpowder in the library of the Escorial which was written about 1250. It is believed that about this time the Arabs or Moors made hand grenades or bombs and fired small balls from tubes carried in the hand or attached to lance-heads. Mr. Joseph Anderson, a former secretary of the Scottish Society of Antiquaries, states that large cannon were used in Europe in siege operations as early as the beginning of the 14th century but gives no details as to size of the pieces or to the places where used. The first English record of guns is a picture and description of a vase-shaped hand gun for firing an arrow; its date is 1326. In the same year the Florentine government appropriated money for the manufacture of guns which were intended for the defense of the city. In 1327, «crakys of war» were used by Edward III, in his campaign against the Scots. No description of these weapons is extant. «Crakys» were used by the French in 1338 and in the same year cannon are referred to in English documents. In 1339, cannon were used by the English at the siege of Cambrai; and Froissart alludes to their use in 1340. At this time experiments were being made at Tournay with long, pointed projectiles. This was not the wonderful innovation it might appear to be at first glance, for round stone balls had not long been in use and bundles of arrows were still fired from many light pieces. About the same time the Duke of Brunswick substituted lead bullets for the small stone balls previously used in his artillery. There is very little doubt that the British used cannon or large hand guns (metal tubes 12 to 18 inches long, one and five-tenths to two inches in diameter secured to the end of an iron rod) at the battle of Crecy in 1346. Edward III, in 1347, used hand guns or very small cannon at the siege of Calais; their power and size can be judged from the fact that the daily allowance of powder for each gun was about three ounces and the daily supply of projectiles for 20 guns was 204 lead shot and 12 pieces of lead.

During the period 1250–1350 A.D. the history of maritime affairs is most unsatisfactory. The Venetians, Genoese, Turks, Moors, Greeks (Eastern Empire) fought many battles but the use of guns is not mentioned in the accounts of them. If cannon were used they contributed little to the result. We may, therefore, conclude that any which may have been employed were weak and ineffective. In the year 1350, however, in a sea fight between the Moorish naval forces of Tunis and Seville, cannon played a leading part; and soon afterward are found on all war vessels. In 1372, short guns of a calibre of several inches were used by the French galleys at the battle of Rhodes. During the latter half of the 14th century the new weapons grew rapidly in size, especially those used for siege and defensive purposes. While the smaller ones continued to be made as breechloaders for 200 years more, guns of large size were almost invariably designed for muzzle-loading. These pieces were at first built up of iron staves arranged around the bore in one or two concentric layers, welded together, and banded with iron rings shrunk on. In some pieces these were a considerable distance apart; but in most of them the rings were close together. Such are the *Dulle Griete* and *Mons Meg*, guns of the period that are still in existence. The former is sometimes called the «great bombard of Ghent» where it was built about 1382 and where it is still preserved as one of the city's chief treasures. It is 16 feet 5 inches long, weighs about 13 tons, and fired a granite ball of 700 pounds. The diameter of the bore is 25 inches. In rear of this is the slightly conical powder chamber, 10 inches in diameter at the front end and six inches at the rear. The part of the gun containing the chamber is smaller than the front part of the gun and is believed to form a separate section screwed to the other. The *Mons Meg* in Edinburgh Castle is of very similar design but smaller, having a calibre of 20 inches and firing a granite shot of 330 pounds. About the end of the 14th century or early in the 15th, machine (i.e., multiple-tube) guns began to appear. In Germany they were called «death-organs» and were made of a number of barrels placed side by side; Weigel mentions one which had 33 barrels or «pipes.» While most of the large pieces of the 13th and 14th centuries were built up of iron bars and rings, cast bronze guns grew steadily in favor. The first one of which we have information was cast at Augsburg in 1378. During the early part of the 14th century many others appeared. In 1451 Mahomet II, cast some very large bronze pieces for the attack on Constantinople. The size of the first three is not exactly known as the descriptions are inaccurate and confusing. One is said to have had a calibre of 25 inches and to have fired a stone ball of more than 600 pounds weight; the other two were nearly as large. They were, therefore, about the size of the *Dulle Griete*. Much larger guns of similar pattern were afterward installed in the defenses of the Dardanelles. They fired stone shot of 1,100 pounds and had a calibre of about 30 inches.

Guns of widely diverse types appeared in the 15th century. Mortars of three or four calibres length and long breech-loading guns of 60 calibres were used side by side. The charges of powder used in each were ridiculously small though the powder chambers of muzzle-loading bombards were of such size as to indicate a low density of loading — probably to facilitate combustion of the charge as the powder used in the guns of the 14th and 15th centuries was usually of very inferior quality. The ingredients were often impure, imperfectly prepared, and, being commonly mixed on the spot, were unevenly combined. The proportions used varied within wide limits. Sometimes they were one part saltpeter, one part charcoal, one part of sulphur. Even when the designed proportions were correct, the ingredients were measured by guess and mixed without care: Each substance was supposed to be carefully powdered in a mortar so that the resulting product was of the same consistency. The term «serpentine» was applied to these so-called «mealed» powders and, after granulation became common, to any mealed powder. The granulation of early powders was effected by mixing the ingredients in a moist condition and then drying. The grains were irregular in size and shape but all were small. Granulated or «corned» powder, as it was first called, came slowly into use during the 15th century, being employed in some hand-guns as early as 1429 at least. In charges of some size it burned more rapidly than the closely packed «meal» or «serpentine» powder and was not much used in large cannon until they had been increased in strength and both gun and powder adopted to each other. Spherical cast-iron, cast-brass and cast-lead shot were used to some extent in guns of moderate or small calibre before the projection of arrows and bundles of arrows or stones were given up. Stone shot continued in use in very large guns until the 17th century when the construction of pieces of excessive calibre was abandoned. Cast-iron shot came into general use for medium and small calibres about 1450 and by 1500 had displaced stone entirely in guns of that character. Incendiary shell fired from mortars soon became explosive shell, but it was not until late in the 17th century that they were made self-igniting — that is, ignited by the flame of discharge. Bundles of bullets, bolts and metal fragments of all sorts, pieces of chain, iron bars and the like were fired from long or short guns whenever they seemed likely to prove effective. As an adequate quantity of such material was not always at hand, bar-shot, double-headed shot, chain-shot, case-shot, grape, etc., were designed and made a part of the projectile supply for large guns.

The very heavy pieces of the 14th and 15th centuries were fired from positions on the ground. Some rested in heavy wooden cradles that could be wedged up at the muzzle end to increase the elevation; while the recoil was taken by timbers braced against short piles or stakes driven into the earth. By the end of the 14th century the cradle of some of the lighter siege pieces was mounted on wheels and they began to be employed in ordinary field operations. In the 15th century, the cradle was separated from the carriage frame and trail and fitted with an axle directly above the axle of the wheels. The rear end of the cradle passed between two upright timbers on the trail and was held at the desired elevation by a pin passing through the timbers and the cradle-end. In the 16th century, trunnions were cast on the gun and the cradle discarded. By this time mobile artillery had become an important part of all armies. Bad roads and soft ground emphasized the necessity for lightness in field guns, heavy pieces being necessarily left behind in a rapid advance or retreat. The tendency toward decreased weight culminated in the kalter or «leather» gun of Gustavus Adolphus. This consisted of a cylinder of copper banded with iron and wound with rawhide rope. It was a feeble piece of artillery but it could accompany mounted troops and could be loaded and fired two or three times as fast as the musket of that day. Increasing knowledge of the metallurgy of iron led, in the 16th century, to the production of cast-iron guns though bronze guns continued to be made, especially for field service, during the next 300 years. The advent of cast-iron was accompanied by a change from breech to muzzle loading, a general reduction in calibre and weight, and an increase of muzzle velocity and gun-power. In the 16th and 17th centuries a few rifled cannon and small arms were made, but difficulties with the projectiles and the change to muzzle-loading caused the attempts at rifling to be given up.

The growing power of guns and greater regularity of range due to better powder led to a desire for more accurate pointing, especially in elevation. Adequate lateral direction could be effected by sighting along the «line of metal» or median line of the top of the piece and this was further facilitated by notches cut on the upper side of the muzzle or breech. But the elevation could not be so easily determined until, about 1550, Tartaglia devised the «gunner's quadrant.» This consisted of a device resembling a carpenter's square on which was secured the graduated quadrant of a circle. The centre of this quadrant was at the angle of the square where the end of a plumb line was secured. The long arm of the square was inserted in the bore and as the gun rose in elevation the angle was shown by the plumb line and quadrant. About 1600 a dispart sight was used for short ranges. This consisted of a block set on the muzzle, the notch in the top of the block being at the same distance from the axis of the bore as the notch in the base-ring of the gun-breech. During the 17th century guns commenced to take on a more definite form. Pieces of great size and calibre were given up. Classification was attempted. Although many names were applied to guns of different size, ordnance was beginning to be designated by type and weight of the solid iron shot which it fired. Four types of cannon were now in use in British naval vessels — (a) culverins, long slender guns; (b) cannons of battery, shorter and stockier pieces; (c) petrieros, guns firing stone balls with rather small charges; (d) small pieces with various names such as minion, saker, falcon, falconet, etc. Each type was made in three lengths, extraordinary, ordinary and bastard; thus, extraordinary culverins were 39 to 41 calibres in length; ordinary, 32; bastard, 26 to 28. Land guns were similarly named and classed but they also included the mortar and the trabuccho (which differed from the mortar only in having the trunnions at the breech end instead of in the middle. Whole culverins fired shot of 40 to 60 pounds or more; culverins, 20 to 35 pounds; demi-culverins, 14 to 18; whole cannon, 70 to 120 pounds; cannon, 30 to 50; demi-cannon, 20 to 28; quarter-cannon, 16 to 18; saker, or quarter culverin, 8 to 12; falcon or half saker, 5 to 7; falconet, 2 to 4; rabinet, or smeriglio, ½ to 1.

In the 17th century, naval guns were gradually reduced to two types; long (18 to 25 calibres in length), and short (about 15 calibres). Near the end of the century, carronades began to be used, particularly for upper deck guns. They were very short (5 or 6 calibres) and light, but fired large projectiles — of course with low velocity. Naval actions were usually fought at such very short ranges that a gun of this type was often exceedingly efficient. The heaviest naval guns were 42-pounders, but few pieces larger than the 32-pounders were carried and these by ships of the line. The gun-carriages were constructed with heavy wooden sides called brackets joined by similar flat timbers called transoms — the whole supported on wooden trucks 6 to 10 inches in diameter. The trunnions of the gun rested in trunnion sockets in the tops of the brackets. At the end of the 17th century, land guns for sea-coast fortifications were similar to the long naval pieces. Field guns were of three principal types, cannon (15 to 25 calibres long), howitzers (8 to 10 calibres) and mortars (3 to 5 calibres). During the 18th century many important improvements were made in ordnance and gunnery. About 1739 the French devised the plan of casting the gun solid and boring it out. This added nothing to the strength but much improved the accuracy. In 1742, Benjamin Robins, an English mathematician and military engineer, published his work entitled 'New Principles of Gunnery' which revolutionized ordnance and gunnery and founded the science of ballistics. In conducting his researches Robins invented the ballistic pendulum, determined the path of projectiles in the air and investigated the air-pressure against them. He pointed out the desirability of rifling guns and expressed in strong terms the advantages which would accrue to any nation which would first succeed in arming itself with efficient weapons of this type.

Between 1765 and 1780, General Gribauval drastically reorganized the French artillery, separating the field, siege and fortress services; organized siege trains; made the 12-pounder the heaviest field piece and reduced the weight of all field guns and carriages; and adopted the howitzer and mortar for field and siege purposes. Gribauval's work laid the foundation for Napoleon's success. Among other great improvements, Gribauval introduced tangent sights, elevating screws and canister or case shot — innovations that were not generally adopted in other services for nearly half a century. In 1782, Sir Charles Douglass fitted flint locks on the guns of the ship he commanded but as they were unsatisfactory in windy weather they were not exclusively adopted in the British navy for many years. At the beginning of the 19th century, aside from notches on the muzzle and base-ring, gunsights were not common. Dispart sights were supplied but it does not appear that they were regarded as very useful. In 1801, gun sights allowing for range were proposed to Nelson. He said he would be glad to examine them but hoped that he would always get near enough to the enemy to render sights unnecessary. They were not fitted to his guns and for lack of them, a few days later, the British were unable to carry on a successful long range battle with the forts at Elsinore.

In 1807, an English clergyman by the name of Forsyth discovered a percussion composition but its importance was evidently unappreciated for it did not come into general use for a quarter of a century. The British navy adopted improved gun sights slowly and reluctantly until after the War of 1812. Nor does it appear that they were officially adopted in the navy of the United States. But it has been stated that many American officers devised sights of improved pattern which they used on their own guns with great success. If these statements are correct, the general superiority of American naval gunnery in the War of 1812 is readily accounted for, as well as the occasional equality or inferiority to the gunnery of the British.

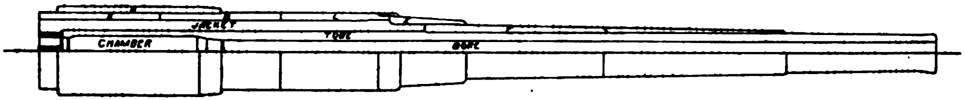
After the close of the Napoleonic wars and of the War of 1812, the occurrences and incidents of those wars were closely studied and the advantages of large guns over small ones became more appreciated. Attention was directed to improved sighting; to gun-locks; to mounts for guns of all kinds; to improved design of guns; to the production of better gunpowder, etc. The people at large, however, were weary of war and of matters pertaining to war and the adoption of the new ideas proceeded slowly. In 1821, General Paixhans, an artillery officer of the French army, published his celebrated work entitled the 'Nouvelle Arme' in which he laid down the following propositions: (1) «Of all the improvements tending to increase the effect of naval artillery that which will give incomparably the greatest power will be the abandonment of solid shot and the substitution therefor of hollow shell charged with powder to explode them»; (2) «although increase of power, by increase of calibre, has progressed for a long time, the *maximum* increase of power has not yet been attained»; (3) «although simplification by reduction of the number of calibres has progressed for a long time, unity of system has not yet been attained, but this unity of system will result from the attainment of the maximum power.» In other words, he advocated the use of a single calibre of guns for each ship and that of the largest size practicable, and a substitution of shell for solid shot. His ideas were not fully carried out until the appearance of the *Monitor* in the American Civil War and the principle of a single calibre was not definitely adopted until the general acceptance of the all-big-gun type of battleship in 1905. The first large shell guns made from Paixhans' designs were completed about 1824. Though shell had been used in land guns of short length for several centuries, smashing or penetrating power was not sought and the walls of such projectiles were comparatively thin. Paixhans' shells were of a new type suited to the new conditions. The shell gun made its way slowly but steadily and other improvements followed in its train. In 1828 percussion locks were fitted to the guns of the U.S.S. *Vandalia*, but the violent recoil of the hammer prevented their general adoption in the United States navy until 1842, when Hidden patented his lock with a slotted pivot which permitted the hammer to be drawn clear of the vent as soon as it struck its blow. The French produced an efficient percussion lock about 1832, but the British continued to use the flint-lock until 1845 when they adopted a modification of Hidden's. In the meantime, Colonel Jure of the French artillery brought out his improved gun-sights in which the front sight remained fixed while the rear one was adjustable for any given range.

General Paixhans had predicted that the adoption of the shell gun would force the application of armor to ships' sides. When the shell-gun idea had become settled, he therefore proposed (1841) plans for armored ships and further predicted that the adoption of armor would force the use of rifled guns. The first armored vessels were finished in 1854 and in the same year the French completed several 6.5-inch cast-iron rifles. These were tried out in actual service in the Crimean War and were so much superior in range, destructive power and general efficiency to the old smooth-bores that rifled guns were at once adopted not only by the French navy but by the navies of all the European powers; and experiments with rifled guns for land service of all kinds were soon undertaken. The difficulty of loading via the muzzle tight-fitting projectiles possessed of adequate means of effecting rotation renewed the attempt to solve the problem of breech-loading. In 1845, Cavalli, in Italy, and in 1846, Wahrendorff, in Austria, brought out sliding-wedge breech-blocks of much merit and they would probably have been developed to success had the breech-loading rifle then been generally regarded as inevitably the gun of the future. The Wahrendorff design was practically identical with that adopted and still used by Krupp. The result of the breech-loading experiments, 1855–60, resulted in the satisfactory development of the sliding wedge system by Krupp in 1860–61 and the interrupted screw system by the French about the same time. The latter was originally an American invention which the French improved and both the French and Krupp systems were rendered practicable by the use of the Broadwell ring which was invented by an American officer of that name.

The increased powder charges and pressures in rifled guns — especially the breech-loaders — and in smooth-bore guns which attempted to compete with them led to strains which ordinary cast-iron guns were unable to withstand. Rodman introduced improved methods of casting and a slower burning powder, but the real solution was found to be in built up guns — first of wrought iron or cast-steel and eventually of forged steel. The stresses upon the various layers of metal about the bore of a gun are nearly in proportion to the square of the distance of the layer from the axis of the bore. The outer part of a thick homogeneous tube would therefore be but slightly affected when the inner part would be strained beyond the breaking point. Layers of varying strength and elasticity were therefore necessary. Further strength was given by shrinking the outer tubes, jackets, and hoops upon the inner ones. This placed the latter in a state of initial compression so that they were not strained at all until considerable stress was felt by the outer layers. Wire-winding of guns was suggested by Dr. Woodbridge, an American ordnance engineer, in the early days of built-up guns but the principle was not developed to a practical solution for many decades. The cast-iron smooth-bore shell gun reached the culmination of its development during the Civil War under conditions which rendered its use not unduly inefficient compared with the rifle. And it was retained in the American navy for nearly 20 years after it was obsolete because of the parsimony of Congress in naval and military affairs combined with undue admiration for its performances in the war. The next step in gun development after the adoption of rifling was the increase of velocity due to improved powder. The combustion of the powder in common use was so rapid that the gas pressure in the gun reached its maximum before the projectile started to move and then fell so quickly as to be almost negligible, so far as propulsive effort was concerned, when the shell reached the muzzle. About 1856, Major Rodman of the United States Army developed his system of making slow-burning gunpowder by which the maximum pressure was kept within bounds while the average pressure was considerably augmented. But the black powder of that day could only be controlled within narrow limits. About 1880, a slower burning powder made from incompletely charred wood came into use. From its color it was known as *brown* or *cocoa* powder. It ignited readily but burned slowly so that with a given maximum pressure the sustained pressure was much greater. To efficiently use the new powder longer guns were necessary and the length jumped from about 20 to 30 and 35 calibres.

In 1881 was initiated a movement which led to most important changes in the construction of the breech mechanism of guns and the means and methods of loading. Up to this time no great effort had been made to accelerate the speed of loading and the time wasted, even in operating small pieces, was absurd. Toward the end of 1881 the British Admiralty advertised for designs of a gun that should fulfill the following requirements: weight of gun and mount not to exceed 10 hundredweight (1,120 pounds); projectile to weigh 6 pounds and have a muzzle velocity of at least 1,800 feet per second; projectile and powder to be made up in one cartridge; service of the gun to require not more than three men; under the foregoing conditions the gun to be capable of firing at least 12 aimed shots per minute. About the same time the French Minister of Marine invited proposals for a 3-pounder gun which was required to fulfill the same relative conditions. In answer to these proposals the first *rapid-fire* guns were produced. Mr. B. B. Hotchkiss, an American ordnance engineer and manufacturer who had established an ordnance factory in Paris about 1870, brought out a series of guns — one, three, and six pounders. While his guns were accepted by nearly all foreign navies, his first order was from the United States navy which had just laid down the first ships of its modern fleet. Mr. Nordenfeldt brought out very similar guns in England. The six and three pounder guns called for by the British and French navies were intended for use against torpedo boats which were then small and weak. The success of these guns led to an extension of the principle to larger calibres, but it was some years before the breech mechanisms of guns larger than the 4-inch were satisfactory. Every form of breech closure in which the operation had been accelerated was styled *rapid-fire* by its makers, but the term was finally restricted to guns in which the breech was opened by the simple throw of a lever. At first, the charge and projectile were made up in a single cartridge but in calibres above 5-inch this was found impracticable and after 1897 the charges for guns of calibres exceeding 5-inch were as a rule not even cased. While the breech-mechanism of guns of 8-inch calibre and over was not adapted to easy operation by a simple hand lever, the speed of opening and closing the breech and of loading was relatively as much increased as in small guns. In 1884 the average time required to load a 12-inch gun was four minutes; in 1914, for naval guns it was not more than 20 seconds.

The automatic principle which is so successful in machine guns has been applied to pieces of greater calibre but without success in those larger than the one-pounder. Semi-automatic guns of three-inch calibre are, however, now common. In these the force of recoil is utilized to open the breech and eject the empty cartridge case, the closing of the breech being effected by inserting the cartridge smartly so that it trips a pawl on the breech-plug which is then closed by a spring compressed during recoil. The next step in augmenting the power of guns was due to the production of smokeless gunpowder. Its smokeless feature is highly desirable, but an equally or more important gain is the facility by which the rate of combustion can be controlled. Between 1865 and 1870, Schultze in Germany and Von Lenk in Austria developed smokeless powders from nitrated cellulose, but they were not successful in adapting them for use in large guns. But about 1885, M. Vieille, a French ordnance engineer, produced a satisfactory powder from colloided gun-cotton which the French adopted in 1887. Numerous other types appeared almost at once, a large proportion of which contained nitroglycerin as the principal ingredient. The erosive effect of the nitroglycerin powders caused such rapid destruction of the rifling that the proportion of nitroglycerin was steadily reduced, until most modern powders contain only a small percentage of it or are made solely from guncotton. As the manufacture of smokeless powder progressed, guns were extended until a length of 50 calibres was reached in large pieces and 60 or even 80 in small ones. The limit was not due to the inability to control the rate of combustion of the powder but to the fact that in a length of more than 50 calibres adequate stiffness or rigidity of the gun entails a weight that can be more profitably employed in a gun of larger calibre and less *relative* length (*i. e.,* expressed in calibres of the bore).



Section of Built-up Gun.

In the decade of 1890–1900 much attention was paid to the question of strengthening guns by winding them with steel-wire of very high grade. The process was brought to reasonable perfection by using wire of ribbon form or of some special section laid on with the proper increasing tension. Guns which are wire-wrapped are unquestionably stronger in a circumferential direction than those built up with steel hoops, but the wire wrapping makes it difficult to secure adequate longitudinal rigidity in pieces of 35 calibres or more. As guns built up without wire wrapping are able to withstand initial pressures of 20 tons per square inch with a good margin of safety, as pressures of more than 17 tons caused too much erosion, and as wire-wound guns lacked rigidity (and therefore accuracy) unless very heavy, wire-winding has not come into general favor, having been adopted only by Great Britain. Since 1900 the improvements in gunnery methods, range-finding, the "spotting of hits," etc., have greatly extended the effective battle range. This in turn has had a marked effect on the maximum calibre of a ship's guns. Since the accuracy, range and destructive power of guns increase with the calibre, it is manifest that as soon as range-finding and spotting are able to determine the fall of shot beyond the effective range of existing guns, a larger calibre is demanded and larger ships must be built, if necessary, to carry the new weapons. We have now reached 16-inch (possibly 18-inch) guns and 42,000-ton battleships and there is no convincing reason to believe that these are ultimate limits.

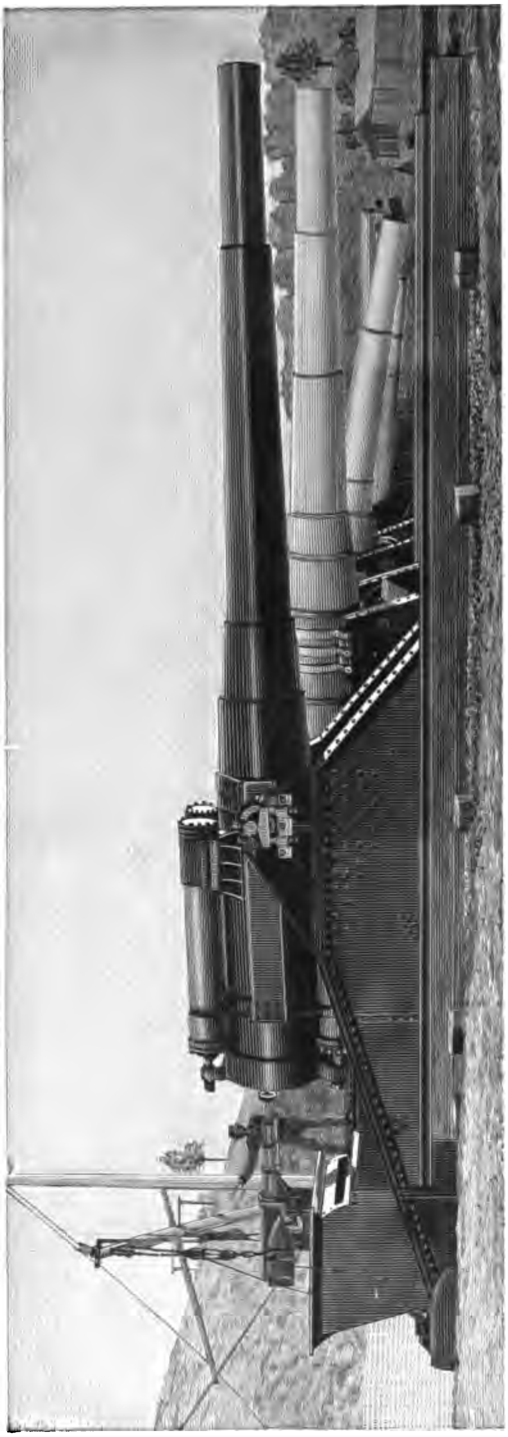
Coast-defense guns have followed the same lines of development as the naval. Mobile artillery and land guns for interior fortifications and siege operations have advanced on lines of their own. At the outbreak of war in 1914 the standard field piece in all armies was of about 3-inch calibre. The developments of recent years have been connected with the adaptation of heavy guns of all kinds to field work, increase in size and use of howitzers and mortars, improvements in gunmounts, ammunition and ammunition supply. The application of rapid-fire mechanism to field guns was of little value until the recoil was controlled so that the gun would not be thrown out of line by every shot. This was achieved by means of long recoil cylinders and a spade (a sharp projection for entering the ground) on the trail, while slight variations of direction were corrected by fitting the gun-cradle on a pivot or slide to give a train of 6° to 10°. In the Boer War the British found much use for long-range guns of four to six inches in calibre, and in the Russo-Japan War the Japanese used 11-inch howitzers with great success in the investment and reduction of Port Arthur. These were heavy, coast-defense pieces and were moved with much difficulty from one concrete emplacement to another. After the conclusion of the war the Germans began experiments with large mortars of light construction designed for use in siege work and operations against fortifications of all kinds. In this they were followed by the Austrians and French and in a small way by the other powers. On many of these the carriage and transporting trucks had a ring of broad flat pedals separately pivoted to the rim; on others the caterpillar belt was tried. High-explosive shells were brought into general use about 1900 and great improvements were made in shrapnel, particularly as regards the ease of setting the fuse and certainty of its operation. Before passing to a more extended consideration of existing land and naval ordnance, the question of erosion of the bore may properly be examined as it is common to guns of all kinds. It is due to several causes, but so far as large guns are concerned it depends chiefly upon (a) the temperature developed in the gun, (b) the chemical constitution of the powder gas, and (c) the character of the gun-tube. It is effected by (1) chemical action on the metal of the gun, (2) mechanical rubbing of the bore by the projectile, and (3) the cutting effect of gas moving with high velocity. When the charge explodes the temperature evolved is very high, possibly 2,500° C. for nitrocellulose and 3,000° C. for nitroglycerin, the actual maximum temperature of the gases depending upon the rapidity of combustion, the density of loading, loss of heat by conduction and radiation through the gun walls and the increase in volume (due to movement of the projectile) of chamber and bore before the instant of maximum pressure. The whole interior of the bore behind the projectile is exposed to this heat which tends to burn out the carbon from the steel and soften it. The surface of the metal is oxidized, but if the film of oxide is not removed it protects the metal beneath. As the projectile moves forward its rotating band wipes the bore (especially the tops of the lands in the rifling) perfectly clean and so exposes it to renewed chemical action at each shot. In the course of time the combined chemical and mechanical action washes away the lands at the rear end. Before the projectile starts — especially after the lands are much worn — a certain amount of gas escapes around it and causes irregular pitting, grooving and cutting, but this in large guns is almost immaterial compared to the washing away of the lands. Relative to the amount of carbon, hydrogen and nitrogen in its composition, nitroglycerin contains much more oxygen than nitrocellulose. This not only produces a higher temperature, but also furnishes a greater amount of oxygen to act on the metal of the gun. Powders containing nitroglycerin are therefore much more erosive than those made of pure nitrocellulose and the latter are becoming more and more common. Cup discs on the bases of projectiles have comparatively little effect on erosion, but they materially assist in preserving the muzzle velocity of projectiles fired from guns in which the lands are much worn.

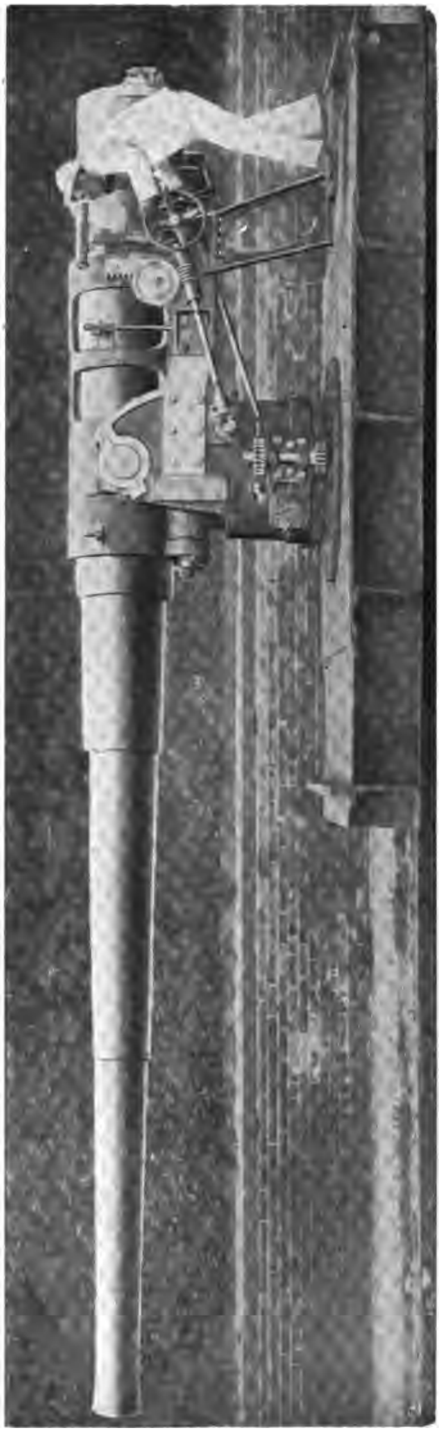
The number of rounds which can be fired from a large gun before it needs relining varies within wide limits. It depends upon (a) the speed with which the rounds were fired, (b) pressure and temperature in the gun, (c) character of the metal of the bore, (d) chemical composition of the powder, (e) means to keep up the velocity in worn guns, (f) opinion of the users of the gun as to when its power has been reduced beyond tolerance. All these factors are variable. In the case of 12-inch guns with velocities of 2,800 feet per second; using projectiles of about 850 pounds and pure nitrocellulose powder; fired not more than six or eight times in one-half hour (the rounds may all be fired in three or four minutes if time for cooling occurs afterward); if cup gas-checks are used on the projectile; if slightly greater powder charges are used as the wear increases; and if the metal of the bore is of the best and most resistant type; then the number of rounds which they may be fired without the loss of more than two or three hundred feet of muzzle velocity is perhaps 150 to 200. Fifty to 75 rounds fired rapidly in battle might give the same destructive results. When the guns are condemned for inaccuracy the tube is removed and a new one inserted. This lining tube extends for about half the length of the bore from the powder chamber toward the muzzle and the cost of dismounting, relining, and remounting the gun is about 25 per cent of the cost of a new piece. To avoid delay reserve guns replace those which are removed from ships for relining. The life of larger or smaller calibres vary nearly in the proportion of the cube of the diameter of the bore. Thus, a 6-inch can fire about eight times as many shots as a 12-inch with the same loss of accuracy. But this rule is no more than a general guide as the length of time a high speed of fire is maintained is a most decisive factor in the result. Guns using powders containing nitroglycerin have a shorter life than those using nitrocellulose. If the nitroglycerin content is 25 per cent the number of rounds is at least 25 per cent less than is possible in a similar gun using a pure nitrocellulose powder. If the muzzle velocity of the projectile is cut from 2,800 to 2,500 feet the per second, the length of life of the piece is extended 15 to 25 per cent, depending upon the character of its use.

Lewis Sayre Van Duzer,
Captain in the United States Navy; ex-Secretary of the United States Naval Institute.

GUNS, Land.— These are usually classed as (a) seacoast artillery, (b) siege artillery,

GUNS





Scientific American

1 Twelve-inch Breech Loading Rifle, Coast Defense Mounting

2 Six-inch Rapid-fire, Breech Loading Rifle

(c) field artillery; as regards type they are divided into (1) long guns or guns, (2) howitzers, (3) mortars, (4) mountain guns, howitzers or mortars, (5) aircraft guns, (6) anti-aircraft guns, (7) trench pieces, (8) machine guns. Seacoast guns and some other guns on fixed or railway mounts are long — 40 to 50 calibres. Siege guns are usually shorter — 20 to 30 calibres. Field guns are commonly of about 30 calibres, though the standard French piece of 75-millimeters is 35 calibres and the German only 27.3. Howitzers are 6 to 12 calibres in length; mortars, 3 to 5. But longer howitzers have been built and some pieces 6 to 8 calibres long are officially designated as mortars. An old distinction between the mortar and the howitzer was that the former was set at a fixed angle of elevation and the range varied by increase or decrease of the powder charge. But even in those days mortars were often fitted with an elevating rack on the breech and howitzer charges were increased or decreased for very long or very short ranges. When mortars and howitzers became breech-loading the dividing line between them ceased to exist. The average modern mortar has a maximum muzzle velocity of less than 900 feet per second and the average howitzer of more than 1,100. Mountain or pack artillery is designed for quick mounting and dismounting and for transportation on the backs of mules or horses. The heavier guns and howitzers for mountain or pack service are usually in two parts screwed together. Anti-aircraft guns are nearly all of moderate calibre, but very long and of high muzzle velocity; their marked peculiarities are the high-angle mounting — usually susceptible of easy traverse or train — and a special form of sight. Naval anti-aircraft guns are commonly fitted with prismatic sights which enable the gun-layer to stand erect when aiming. Some land guns are so fitted. The objection to such sights is the difficulty of picking up the target unless they have a «finder» attached to them. Trench artillery consists of small weak mortars or howitzers for throwing large charges of high explosive into the enemy's trenches or positions. They are often mere tubes of copper or wood using compressed air or even springs as a projecting force. Machine guns are commonly classed as an infantry weapon and not included in the term artillery. Nearly all use the same cartridge as the troops with which they are operating. Very small portable 1-pounder guns are used to some extent by infantry and machine gun units against concrete shelters and stone or brick dwellings protecting enemy forces, especially machine gun detachments. They resemble closely the old short 1-pounder rapid-fire gun, but are somewhat lighter.

Coast Artillery.— Seacoast artillery is designed to protect harbors, naval bases, mine fields, etc., against the attack of ships. The modern method of emplacement is to spread the guns over a considerable area while connecting them by supply and control lines so that their operation is nearly as simple as if grouped in the old-style fortifications. Such an arrangement of many powerful guns makes their destruction by an attacking fleet impossible and adds greatly to the difficulty of reducing the fortress group by land siege operations. A very large percentage of existing seacoast guns are mounted on disappearing carriages; howitzers and mortars are placed in gun-pits where they are wholly concealed from lateral view. The use of airplanes in reconnaisance and «spotting» the fall of projectiles has modified the designs for new coast works and it is believed that in future many of the guns, large and small, will be mounted on rails and moved to constantly changing positions. Parapets will still be retained in certain places, but much reliance will be placed on trees, bushes and other means of concealment. Centres of ammunition supply for each group of guns will doubtless be well protected and concealed as far as possible. Ammunition supply roads (for motor trucks) and railways will be given such curves and concealment as to make their destruction difficult and doubtless provision for rapid repair will be made. Guns for the protection of mine fields must be located where needed, the design of emplacements, roads or tracks depending upon the requirements of the particular case. Strong, properly designed land fortifications cannot be destroyed by ships of the most powerful class, even if the latter are very numerous. They can, however, as has been repeatedly demonstrated in the present Great War, be demolished by a sufficiently intense high angle fire from very large guns.

Siege Guns.— In all the protracted sieges of the past two centuries the operations began with light weapons that were slowly supplemented by heavy guns mounted in fixed emplacements or moved with difficulty. In the reduction of Port Arthur, the Japanese made most important use of large howitzers. These were coast-defense guns and set up on a series of concrete emplacements as the line advanced. German study of the war operations led to their development of heavy howitzers which could be moved almost as fast as 6-inch siege guns. The first of these had a calibre of 8.27 inches and larger sizes (9.45 and 11.02-inch) were soon evolved. The larger calibres were originally designed to be installed on timber and concrete beds, but the centipede wheels, in which broad flat treads are pivoted to the rim of the ordinary wheel, so increased the bearing surface that specially constructed beds became unnecessary except in soft ground. These wheels greatly simplified transportation of the guns, the 11.02-inch piece being carried on two vehicles on which the maximum load was 20,000 pounds. Type guns of 16.5 and 23.5 inches were built by Krupp, but it does not appear that they were adopted for regular service, though a few of the 16.5-inch pattern were hastily constructed just before the outbreak of war for the reduction of the Belgian and French forts. Having fully settled on the types of guns and mounts the Germans built large numbers of 8.26 and 11.02-inch pieces and accumulated vast quantities of ammunition for the offensive operations which were to be undertaken whenever excuse and opportunity offered. Austria followed the German lead and provided herself with guns and ammunition in similar quantities. The Skoda Company (Austrian) developed a 12-inch howitzer of great power and mobility which has been much admired and praised; many critics seem to regard it as satisfactorily replacing the 11-inch and 16.5-inch types. Slowly and reluctantly the French provided themselves with the new mobile weapons, but, fearing trouble with the heavy transporting loads adopted by Germany, they cut the weight carried by each vehicle to eleven or twelve thousand pounds. Moreover, the French guns were completely dismounted and when set up for use were installed on an iron and concrete, or an iron, concrete and timber base, while the German guns were fired from their transporting mounts like field guns. Whether the French are now using guns with the broad, flat, pivoted treads on the wheel rims has not been divulged, but reports indicate that the Italians have some of this type. The German and Austrian guns are somewhat longer than the French; indeed, the French call their pieces mortars, though they are apparently at least six or seven calibres long.

The British had very few guns of this type when the war broke out, but began to supplement their stock of heavy artillery by placing a large number of naval guns on field and railway mounts. Many 6-inch, 7.5-inch. 9.2-inch and 12-inch guns were thus brought into field service and their great range introduced a new element into the fighting. Railway mounting, camouflage and other forms of concealment made concentration of attack on such pieces very difficult while their fire drove the enemy's reserves farther to the rear.

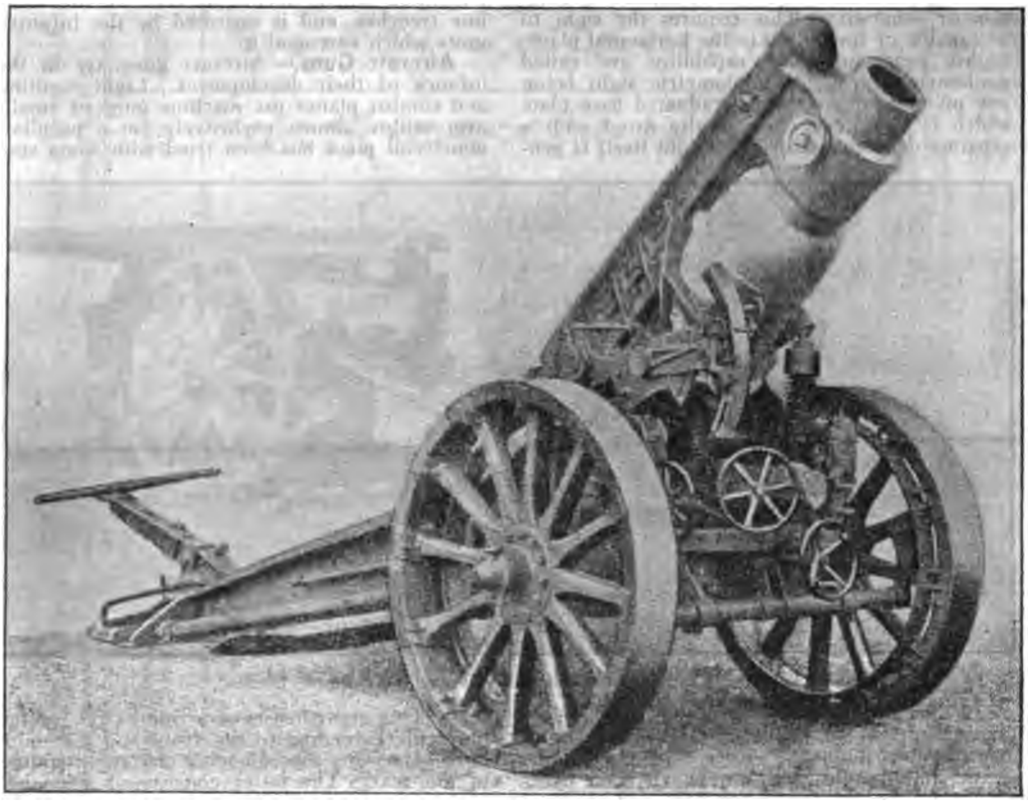
Field Guns.— The field gun in most common use in the armies of all nations has a calibre approximating three inches, none but the British differing more than .05 of an inch from that size. The most powerful of these is the French 75-millimeter. It is considerably the longest, has the highest muzzle velocity and the heaviest projectile. Notwithstanding its excellencies it is the oldest of all and was the prototype and model for every field piece now in use. Previous to the advent of this piece, mounts had changed but little for nearly a century except that steel had replaced wood in the trail and cheeks. The force of recoil was allowed to drive the gun and mount to the rear for some distance. The simple bar sights in common use were thrown off the target at every shot. Usually the gun had to be run to the front a considerable distance before loading and re-aiming. Training was effected by small ropes hitched to the trail by which it was hauled to the right or left. This condition of affairs was permitted to continue because no great amount of time which could be saved was lost. When a charge of black powder was fired the gun position was usually enveloped in a great cloud of smoke that did not clear away for several seconds unless there was some breeze. In the meantime the gun was run to the front again. In the navy, hydraulic recoil cylinders began to be much used in the decade following the Civil War. In 1882 the rapid-fire gun was adopted and the speed of operation of the breech mechanism in all calibres increased steadily but took a great jump ahead with the advent of smokeless powder (1887). Sights and sighting began to improve rapidly soon after the use of smokeless powder became common. Army authorities moved more slowly. In 1891, General Wille of the German army published the 'Field Gun of the Future' and in 1892 General Langlois of the French army brought out his great work 'Field Artillery in Connection with the other Arms.' Both these officers laid down the requirements of a modern field gun and pointed out their advantages. Artillery officers were conservative, however, and it was five years before Colonel Deport's gun was adopted in the French army and several years more before other nations fully accepted the innovation. The most vital of the changes made in modern field artillery consists in keeping the gun in position during recoil. This was effected by fitting a lip (called the *spade*) on the under side of the trail, also wheel brakes, shoes and spikes, and by softening the shock of discharge by means of a long recoil cylinder. If the spade is sunk firmly into the ground and the wheels braked (sometimes fitted with shoes and spikes in very soft or hard ground) the gun is kept very closely on the target. The recoil cylinder is nearly as

French 75-millimeter Field Gun.

Firing the first round—after the first round the gun layers sit on seats beside the breech. The first round sets the spades on the trail and brake shoes. (From *The Engineer*, London).

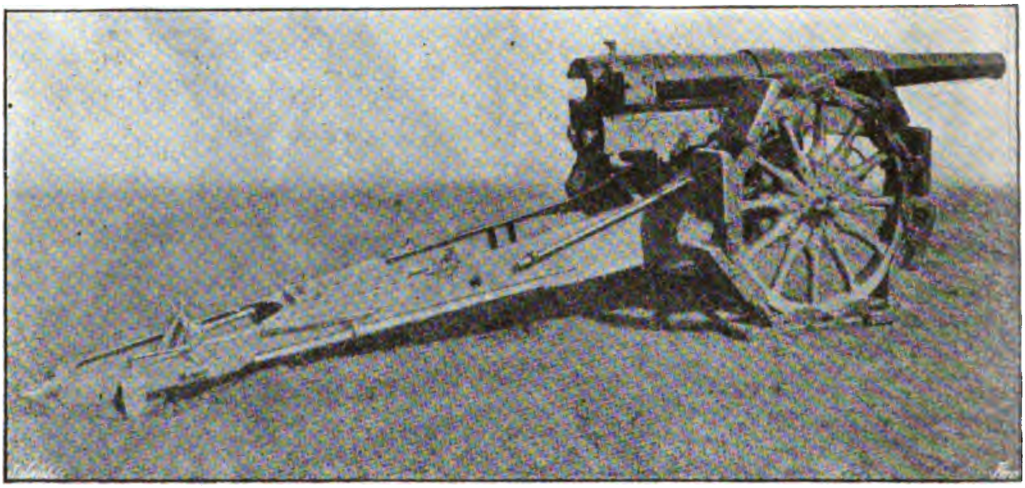
long as the gun. It is similar in principle to the naval recoil cylinder but relatively longer. During recoil the piston presses against liquid (water and glycerine) which is allowed to escape past it in channels that decrease in depth toward the rear. The gun is returned to the firing position by counter-recoil springs or air-pressure or both. By keeping the mount in position during recoil the gun layers can remain at the sights and receive some protection by shields attached to the mount. While the mount is held quite firmly there is more or less movement. The slight change in elevation can be corrected at the sights, but any error in train would involve resetting the spade of a rigid mount; to avoid this, the gun can be given a train of 3° or 4° each way on its mount without disturbing the trail or wheels. Improvement in the sighting apparatus became possible in the new mounts and was rapidly introduced. In modern field artillery fire the target is rarely visible to the gun layer as the pieces are usually placed behind some sort of parapet, bank, rise of ground or screen over which they fire. Until quite recently the elevation of field guns was effected by means of some form of gunner's quadrant located on the right side and operated by a sight-setter seated beside it. The quadrant arm on pieces of that type is pivoted at its front end; at its rear end it is geared to a drum on which are marked the ranges; on its side is pivoted a shorter arm carrying a spirit level. When the drum is revolved until the correct range shows against the zero mark, the rear end of the quadrant arm is raised through the corresponding angle. If the target is at the same height as the gun, the breech of the latter is now lowered until the spirit level shows the quadrant arm to be horizontal. If the target is above the gun, the angle its elevation subtends must be provided for. This is done by raising the short arm carrying the spirit level through the angle (called the angle of sight). The breech is thus lowered through an angle equal to the sum of the angles of elevation and sight.

The *independent line of sight* is designed to increase the speed of sight setting. It is obtained through different means by different designers. As devised by Colonel Deport and fitted to the French 75-millimeter piece, independence is secured by inserting an intermediate carriage between the gun-sleeve and mount and on this are placed the means of giving direction to the gun. For indirect fire, the intermediate carriage is always kept level and the gun is raised to an angle above this equal to the algebraic sum of the angles of sight and elevation. For direct laying the intermediate carriage may be raised or lowered through the angle of sight by aiming through the sight and elevating or depressing the muzzle until the line of sight passes through the target. When using the independent line of sight, the setting of the sight remains unchanged, no matter how often or how much the elevation of the gun is



Krupp 21 C. M. Howitzer on Field Mount. (From *The Engineer*, London).

altered, since the sight is mounted on the intermediate carriage which is always kept level. This method of obtaining an independent line of sight was used with marked success in the Great European War. No country but France had adopted it in 1914 but since that time nearly all new guns of the Entente Allies are fitted with it. Krupp achieved the same result (fixity of the line of sight irrespective of the movements of the gun) by gearing the sight (which is attached to the gun-sleeve) in such a manner that the sight rises in its socket as the breech is lowered, and vice-versa. Since in indirect fire the target cannot be seen, the gun must be pointed at some visible object whose angular divergence from the direction of the target is known or obtained by rapid triangulation or otherwise. This requires the sight to be capable of revolution in the horizontal plane. Sights possessing this capability are called goniometric, a simple goniometric sight being one pivoted on a circular graduated base plate which is kept level and usually fitted with a separate deflection scale. The sight itself is generally some form of telescope. Heavy field guns of 3.3 to 4.7 inches calibre were built in considerable numbers before and during the great World War, but they have been overshadowed by the large howitzers which have to a considerable extent replaced them.



Krupp 4.7 inch Heavy Field Gun. (From *The Engineer*, London).

Horse artillery differs from field artillery in lightness and mobility. When cavalry was the principal scouting arm, horse artillery was designed for accompanying a reconnaissance in force by mounted troops. In the recent great war, horse artillery had no special opportunity to show its importance or lack of importance. Horse artillery guns have, as a rule, the same calibre as the light field artillery but the guns are shorter and weaker and the projectiles are commonly of less weight. Horse artillery howitzers have about the same weight as horse artillery guns, but of course have greater calibre. On the Austro-Italian front mountain artillery has had full opportunity to earn its name. But heavier guns than those commonly classed as mountain pieces have there been liberally employed in places where even pack animals could not go. Guns and ammunition were hoisted up precipitous slopes to points that could only be reached by trained mountain climbers. Trench artillery has a most important use but it lacks definiteness as regards design. Much of it has been hastily extemporized, even the ancient ballista being again brought into use. The French, who compress air for the counter-recoil cylinders of their field guns, are using compressed air for projecting high explosive charges from their trench pieces. Trench mortars are used for throwing gas shell, illuminating shell, etc., on points inside the ordinary field of artillery concentration. Trench artillery is set up wherever it can be conveniently worked, usually in small excavated emplacements in rear of the first-line trenches, and is operated by the infantry units which surround it.

Aircraft Guns.— Aircraft guns are in the infancy of their development. Light scouting and combat planes use machine guns of small-arm calibre almost exclusively but a peculiar, non-recoil piece has been tried with some success. This gun consists of a rifle barrel for the projectile extending to the front and a smooth bore barrel for the balancing charge extending to the rear. The latter consists of fine shot of lead or steel. When the gun is fired the projectile is driven out with a muzzle velocity of about 1,000 feet per second and the balancing charge of shot driven to the rear. The strain on the mount is trifling even with a three-inch gun. Six-inch guns of this type have been built for large bombing and battle planes and for dirigibles. The range of the gun is very great owing to the altitude at which it is fired but the accuracy is of course moderate. In tractor planes. at a target directly ahead, the machine gun must be fired through the axis of the propeller or between the blades. In the latter case, the operating mechanism of the gun is geared to the propeller shaft and permits firing only when the propeller blades are clear. In some battle-planes the machine guns are operated in pairs, giving a double weight of fire by a single operator.

Anti-Aircraft Guns.— Anti-aircraft guns

LIGHT FIELD GUNS OF FOURTEEN NATIONS ENGAGED IN THE WORLD WAR OF 1914.

(Data chiefly derived from Colonel Bethell's 'Modern Guns and Gunnery,' corrected to 1913)

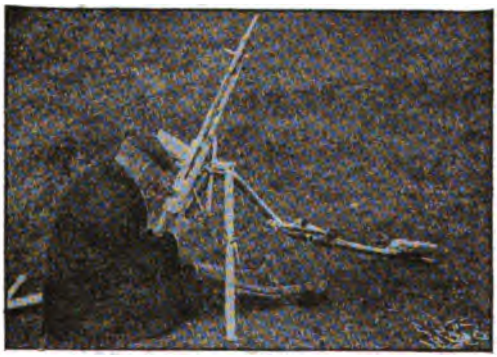
DETAILS OF GUN, ETC.	Austria 1905	Belgium 1905	Bulgaria 1905	France F. A. 1898–1902	France H. A. 1913	Germany 1906	Great Britain F. A. 1903	Great Britain H. A. 1903	Italy 1912	Japan 1905	Russia F. A. 1903	Russia H. A. 1913	Turkey 1904	United States 1902
Gun, calibre, inches	3.01	2.95	2.95	2.95	2.95	3.03	3.3	3.0	2.95	2.95	3.0	3.0	2.95	2.95
Gun, length in calibres	30	30	31.4	36	31	27.3	29.4	24.4	30	30	30	31.5	30	29.2
Gun, weight, lbs.	784	747	842	1,008	750	858	1,008	672	762	762	879	773	758	795
Gun, muzzle velocity, ft. per sec	1,640	1,640	1,640	1,739	1,550	1,525	1,590	1,658	1,675	1,700	1,930	1,666	1,640	1,700
Gun, muzzle energy, ft. tons	275	266	266	334	265	242	324	239	278	288	373	278	267	300
Gun, breech action (wedge, swinging block or eccentric screw)	W	W	S. B.	E. S.	E. S.	W	S. B.	S. B.	E. S.	W	S. B.	S. B.	W	S. B.
Gun and carriage, weight, lbs.	2,240	2,240	2,268	2,509	2,117	2,162	2,772	2,184	2,307	2,206	2,324	2,212	2,363	2,500
Gun and limber (filled), weight, lbs.	4,200	3,864	3,864	4,144	2,979	3,976	4,480	3,668	3,808	3,724	4,312	3,584	4,256	4,100
Sights, goniometric, telescopic, panorama or ordinary	P	P	O	G	G	T, G	T, G.	T, G	P	T, G	O, P	P	O	O, P
Maximum elevation, degrees	18	15	15	12	16	16	16	17	45	29	16½	16	16	16
Line of sight, independent or not	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	No
Traverse each way, degrees	4	3½	3	3	3	4	3	3	25	3	2½	3	3½	4
Traverse on pivot or along axle	P	P	A	A	A	P	P	P	A	P	A	A	P	P
Recoil, length, inches	51.5	51	50	43	52	44	48	48	40	55	42.5	50	52	50
Counter recoil, springs or compressed air	S	S	S	C. A	C. A	S	S	S	S	S	S	C. A	S	S
Wheels, height, feet	4.25	4.27	4.33	4.0	4.67	4.44	4.67	4.67	4.3	4.3	4.33	4.33	4.3	4.67
Wheels, width of track, inches	60	58	57	60	60	60	62	62	58	55	60	60	58	62
Shield, thickness, millimeters	4.5	5.0	4.0	5.0	3.5	4.0	?	?	4.0	3.6	5.0	3.5	4.0	5.0
Shrapnel, weight, lbs.	14.72	14.3	14.3	15.96	15.96	15.0	18.48	12.54	14.3	14.3	14.45	14.45	14.3	15.0
Shrapnel, number of bullets	332	295	294	292	292	300	375	236	350	210	260	260	295	252.0
Shrapnel, number of bullets to lb.	50 & 35	42	45	38	38	45	41	41	50	28.4	43	43	45	36.6
High explosive shell carried or not	Yes	Yes	U	Yes	No	Yes	No	No	Yes	Yes	Yes	No	Yes	U
High explosive shell, per cent of total	33	?	20	11.5	0	20.2	0	0	?	33	?	0	?	0
Rounds of ammunition in limber and carriage	33	40	38	24	0	36	24	24	32	36	36	12	48	40
Rounds of ammunition in wagon limber	30	40	38	24	12	36	28	28	32	36	40	?	48	36
Rounds of ammunition in wagon body	60	61	60	72	?	52	48	48	64	64	48	?	48	70
Rounds of ammunition per gun, total (approximate)	168	242	332	312	?	126	176	176	224	136	216.5	?	188	358
Wagon, packed, weight, lbs.	4,312	3,954	3,808	4,312	3,080	4,088	4,116	3,416	4,032	3,864	4,256	3,584	3,954	4,144
Guns in a battery, number	6	4	4	4	4	6	6	6	6	6	8	4	6	4
Wagons in a battery, number	9	8	12	12	8	6	12	12	12	6	16	8	9	12
Makers of guns	Govt., Skoda, Ehrhardt	Krupp, Cockerill	Schneider	Govt.	Schneider	Govt.	Govt., Elswick, Vickers, Coventry	Govt., Elswick Vickers, Coventry	Deport	Govt.	Putilov	Schneider	Krupp	Govt.

Many new models of field guns were developed during the World War. All are said to have independent line of sight and capability of high elevation.

Ammunition notes: The French high explosive shell weighs 11.68 pounds; muzzle velocity, 2,050 f.s.; wagons containing it weigh about 335 lbs. (less than those loaded with shrapnel. German battery storage wagons carry six rounds of high explosive shell and the light ammunition column 103 rounds of shell or shrapnel; this is additional to the figures given. United States batteries carry four rounds on the gun carriage which are included in the total. U stands for universal shell; description given in the text. The details of the new United States field gun have not been published. The date at the top of each column is the year in which the piece was adopted.

are of many kinds and sizes. The great majority of the guns are of about three-inch calibre but automatic one-pounders and three-pounders have been built, and four, five and six-inch guns are used. The projectiles are mostly shrapnel or time-fuse shell of special type which break up into many small fragments when they explode. Guns on fixed mounts like those on board ship and in the permanent defenses of London and Paris are mostly mounted on high pedestals. Split-trail mounts are used for field service but ordinary field guns are made available by dropping the trail in a pit. Improvement in anti-aircraft guns and mounts (power, range, speed of fire, sights, care of handling etc.), in projectiles, in range and speed determination, in «spotting» of shrapnel bursts, and in general fire control has so greatly augumented their efficiency that bombing planes over London and Paris are forced to altitudes of more than 10,000 feet.

Machine Guns.— Machine guns are of many types; all now in use are automatic. Heavy, water-cooled guns are preferred for service in which weight is unobjectionable as they have a much longer life with prolonged fire. But for guns to accompany infantry advance or retirement, light air-cooled guns are desired. Nearly all light machine guns are operated by gas pressure acting against a piston or lever. As far as practicable the line of movement of the mechanism should be parallel to the axis of the bore and as near it as possible in order not to throw the gun off the target. Many of the heavier machine-guns are operated by the recoil of the breech-block and are variations of the Maxim. The latest machine gun is the Browning, which has been adopted by the United States army. The heavy type is water-cooled and operated by the recoil of the breech block on the Maxim principle. It weighs 34.5 pounds. Stripped of its water-jacket and arranged for airplane duty it weighs 22.5 pounds. Many light air-cooled machine guns are fitted with shoulder pieces or stocks and are practically automatic rifles. The light Browning gun is a piece of this character. It resembles a rifle externally and is frequently styled an automatic rifle. It weighs 15 pounds and can fire 350 shots at maximum speed without overheating or injury. The ordinary magazine — loaded like a clip — contains 20 cartridges which can be fired in two and one-half seconds. The larger magazine holds 40 cartridges. The mechanism is arranged with a cut-off that permits a single shot to be fired with each touch of the finger on the trigger. Machine guns have played a most important part in the present war and automatic rifles may play a still more important one if they can be produced in sufficient quantities..



Coventry Ordnance Works Machine Gun (on high angle mounting). (From the *Naval Annnal*).

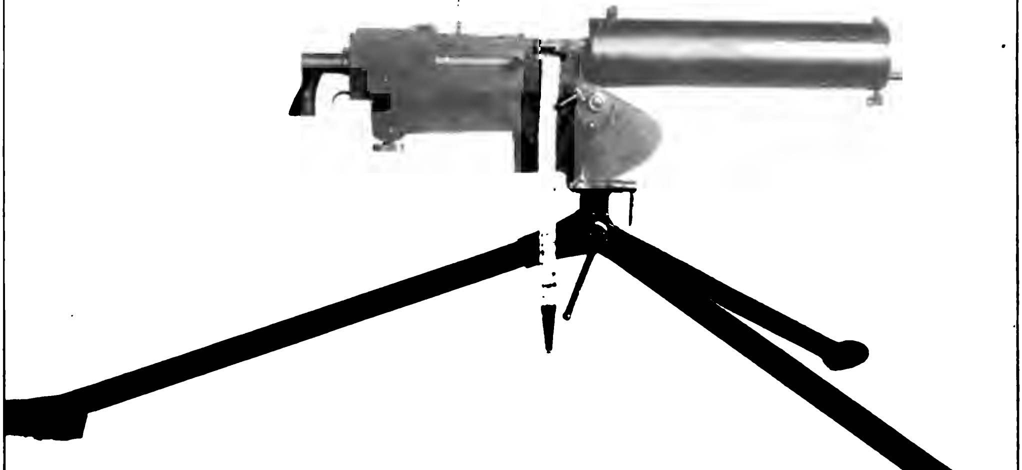
Ammunition.— The ammunition used by heavy field and siege guns consists principally of high-explosive shell, but shrapnel, universal shell, illuminating shell and poison gas shell are also used. Light field guns use all these but chiefly fire shrapnel and universal shell. The latter is a combination of shrapnel and high explosive shell. The cylindrical part of the shell is much like a shrapnel and explodes like one. The ogival with its high explosive contents continues on and explodes on impact. Illuminating shell contain a flaming composition which may be used for lighting up a target area. Poison gas shell are designed to disseminate gases which are deadly poisonous, dangerous to life, or hurtful in some way. The part played by artillery in the present great war has been a most important one. The heavy guns have shown the futility of permanent fortifications while the lighter field and machine-guns have mowed down infantry in the open with a precision and completeness never hitherto approached. The successes obtained have been due to airplane reconnaissance, mapping and «spotting»; to the large calibres of the heavy guns with the resulting power and range; to the vast numbers of guns of all sizes; to the limitless ammunition supply; and to improvements in guns and fire-control.

LEWIS SAYRE VAN DUZER,
Captain in the United States Navy, ex-Secretary of the United States Naval Institute.

GUNS, Naval. Naval guns of the present day vary in calibre from 1.46 to 18 inches and are mostly 45 to 50 calibres in length. The muzzle velocity in the great majority is about 2,800 feet per second, though many very heavy guns have less on account of excessive erosion. The weight of the projectile is about half the cube of the calibre expressed in inches. Thus the cube of 12 is 1,728, and the prejectile weighs 850 pounds; the cube of 10 to 1,000, and the projectile weighs 500 pounds. The weight of the powder charge is from 33 to 45 per cent of that of the projectile, depending upon the character of the powder (pure nitrocellulose or part nitroglycerin) and the designed muzzle velocity.

From 1880 to 1905 the battery of a naval vessel was composed of guns of several calibres. But as fire-control of ship's batteries became more closely studied the folly of such a lack of system became glaringly evident. The present rule is two calibres — one for the main battery and one for subsidiary purposes. For battleships and battle cruisers the most efficient primary battery is 8 to 12 guns in four turrets on the midship fore-and-aft line, the second (from the bow) turret being high enough to fire over the first and the third high enough to fire over the fourth. This arrangement permits half the battery to fire in all directions from ahead to 45 degrees abaft the beam, and the other half to fire in all directions from astern to 45 degrees forward of the beam, while every heavy gun may be fired on either beam from bow to

GUNS



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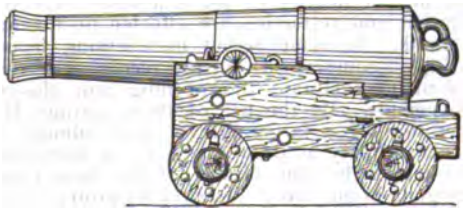
1 Browning Machine Rifle, model of 1918, air-cooled, familiarly called the "light Browning rifle." This rifle weighs 15 pounds, may be fired from shoulder or hip, in bursts of 20 rounds, or by single shots; will fire 20 continuous shots in 2 1/2 seconds

2 Browning Machine Gun, model of 1918, water-cooled, familiarly called the "Browning heavy machine gun." This gun is fed from a belt of 250 rounds of cartridges. In the government test 39,500 shots were fired without break. The gun weighs 34 1/2 pounds, with water jacket filled

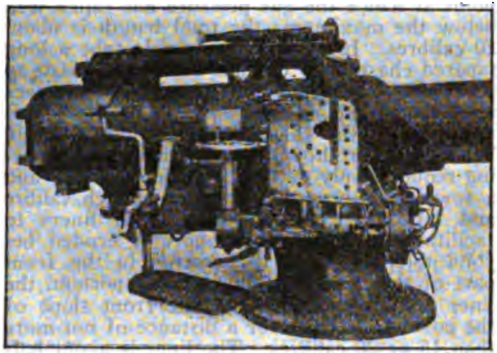
quarter. This is the American system and has been so widely copied in foreign navies as to have become well-nigh universal. A corollary to this principle would be that a vessel should carry at least eight guns of the largest size her displacement permits. This applies to light cruisers as well as battleships and battlecruisers if the forward and after guns are mounted in pairs on the centre line, otherwise six is the most efficient number — one forward, one aft, two each side.

In battleships and battlecruisers the secondary battery is not intended for use in action with other large vessels but as a defense against torpedo craft — destroyers and submarines. It is therefore numerous, most modern battleships and battlecruisers carrying 18 to 24 guns of five to six-inch calibre. These have the highest possible velocity consistent with moderate erosive action in order to give a flat trajectory so that slight errors in range may not result in too many misses at the distance at which torpedo-craft can easily operate. The secondary battery of recent light cruisers is almost negligible and is chiefly designed for training purposes and exceptional use against troops or light boats when operating near the shore. Modern naval gunnery may be said to have been founded by Rear-admiral (then Captain) Sir Percy Scott of the British navy about 1900. It began with the systematic training of the gun-pointers and evolved the modern systems of fire-control of the battery. Adequate control of the mixed battery of guns was found impracticable and although this was not the sole or only strong argument for the change to a one-calibre battery it was, added to the others, decisive. Up to this time (1903–05) the 12-inch gun was regarded as indisputably the best size for the large guns of battleships. But with better fire-control and improved shooting the battle range grew rapidly until it reached a point at which the power of a 12-inch gun was not all that could be desired. Not only was the energy remaining in the projectile of a 12-inch too small to pierce the thick armor of existing battleships at great ranges but the accuracy was less than that of a larger gun because the greater the calibre of a gun the less is the effect of air resistance on the projectile and the less the reduction in velocity and danger space.



32-Pounder Naval Gun (1800).

In view of these facts Great Britain increased the calibre of her heavy naval guns to 13.5 inches; the United States, Japan and Austria followed with 14 inches; two or three years later Great Britain raised it to 15 inches, the United States to 16, and now it is said that the latest British vessels carry or will carry guns of 18-inch calibre. The muzzle velocity of all these new weapons is less than that of the 50-calibre 12-inch guns, but the remaining velocity at 25,000 yards is considerably greater and the destructive effect is enormously more, for the weight of a 16-inch shell is more than 2,000 pounds and that of an 18-inch nearly 3,000. The new British «Hush, Hush» battleship or battlecruisers, on which the 18-inch guns are said to be mounted, are apparently the natural outcome of existing conditions. They are reported as long, fast, of comparatively low freeboard except at the bow and stern and to have little armor except on the turrets and decks.



Coventry Ordnance Works 6-inch Power-worked Mounting (Naval). With Electro-hydraulic Control. (From the *Naval Annual*).

The general design of heavy naval guns has not been materially altered in more than a decade — not very greatly in three. The principal changes are due to improvements in metallurgy and mechanical processes. The steel for the different parts is of higher grade (increased tensile and elastic strength) and its qualities are more uniform and dependable. Nickel-steel (averaging 3 per cent nickel, 0.4 carbon, 0.7 manganese, 0.27 silicon) is used where practicable in those parts requiring a high elastic strength. The net result of better material and improved mechanical processes is a lighter, stronger and stiffer gun. British naval guns are wire-wound, and other nations which buy their guns in England use weapons of this type. The wire is of ribbon form and laid on with increasing tension in each layer. In some designs the wirewrapping extends from breech to muzzle — in others, over the rear half of the gun only. It is usually applied outside the jacket and the first layer of hoops and an outside jacket or casing is shrunk on over it. The wire has more than double the strength of the steel in the hoops of an ordinary built-up gun and gives great transverse strength but as the gas pressure is held down by the erosive action to 16 or 17 tons per square inch, the strength of the ordinary method of construction is ample and that type of piece is likely to prevail, as long as wire-wound guns lack longitudinal strength and rigidity. This lack of rigidity causes the muzzle to droop and «whip» when the gun is fired and slightly decreases the accuracy of fire.

The normal naval gun consists of a central tube extending from the face of the muzzle to the forward end of the screw-box. Over the powder chamber the bore is enlarged 10 to 20 per cent. At the ends of the powder chamber are its front and rear slopes. Beyond the front slope is another conical surface called the shell-centering slope, at the front end of which the bore reaches the diameter of the bottoms of the grooves; then comes the compression slope in which the lands rise to their full height in the length of a few inches. The grooves start without twist, or with very little, but this gradually increases until, near the muzzle, it reaches a pitch of one turn in a length of 25 to 30 calibres. In some guns a second tube of the same length is shrunk over the first. Over the rear end of the tube or tubes is shrunk the jacket. This extends to the rear beyond the tube far enough to form the screw-box and to the front to a point at which the gas pressure has fallen well below the maximum; the total length is about 20 calibres. In guns with a single tube a long tapered chase hoop extends from the muzzle to the jacket, the front end of which it receives in a recess and so overlaps. Over the jacket and part of the chase hoop are one or more layers of short hoops, exceptional strength being required only over the powder chamber and a few inches beyond. Guns of 12-inch calibre and larger are usually fitted with liners to facilitate repair when the bore is eroded beyond tolerance. As the erosion in the front part of the bore is slight and unimportant, the liner usually extends from the front slope of the powder chamber for a distance of not more than 15 or 20 calibres. The liner is about half the thickness of the tube and is made of special steel, not readily oxidizable and with a high elastic limit.

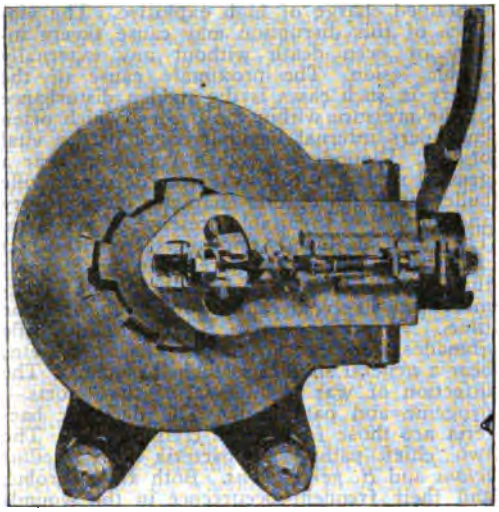
Breech Mechanisms.— The breech mechanism of large naval guns is of two general types, the interrupted screw which is used by most navies and the sliding wedge which is a feature of Krupp guns and is used by Germany and some lesser powers which buy their guns from Krupp. In its early simple form the interrupted screw breech-block consisted of a short cylinder of steel with a heavy screw-thread cut on its outer surface. This screw thread is cut away over each alternate sector of 60 degrees and the thread of the screw-box in the gun, into which the plug fits, is similarly treated. This arrangement makes it possible to insert the plug nearly to its seat in a single longitudinal movement, the lands of the plug sliding in the grooves of the screw-box; then, with one-sixth of a turn the plug is screwed into place. In recent types the shape of the plug has been modified, some being slightly coned, others given a partial globular shape. In the Welin type, the threads are cut on successive segments which are increased in diameter slightly more than the height of the threads on the preceding one. This enables three-fourths or more of the plug to be threaded and requires but two narrow blanks in the screw-box. The result is a shorter, stronger plug which is more rapidly operated. The Welin type of breech closure is used in all United States naval guns. In Krupp guns the jacket is extended to the rear about two calibres beyond the end of the powder chamber. In this projection a longitudinal hole is formed through which the charge and projectile are inserted. Close to the breech face of the tube a transverse slot is cut, cylindrical on the rear side, plane on the front. In this slot slides a very slightly tapered breech-block that is drawn to one side during the loading operation and forced into place to close the breech.

To prevent the escape of the powder gas to the rear (around the plug and through the screw-box) several devices have been and are still employed — the Broadwell ring, the cup gas check and the De Bange gas check. The Broadwell ring is a disc of L-shaped section, the angle of the L being at the periphery. The base of the L rests against the face of the breech-plug, the shank against the walls of the plug-chamber. The pressure forces the lips of the L against the plug and chamber walls thus cutting off the passage of gas. The cup gas-check differs from the Broadwell ring only in being permanently secured to the front face of the breech-plug. The obturator of the De Bange gas check is a ring or annular pad of fibre and suet covered with canvass. A mushroom shaped piece of metal has a stalk which passes through the obturator pad and the axis of the plug, at the rear end of which it is held by large nuts. The pad thus lies between the mushroom head and the front face of the breech-plug proper and when the gases of explosion press upon the mushroom the pad is squeezed out against the chamber walls and forms a perfectly tight joint against the escape of gas. The charges of large guns are ignited by electric, percussion or combination (electric and percussion) primers. These are fired in locks secured to the rear end of the mushroom stem through which the vent passes. In Krupp guns the locks are on the face of the sliding block. The common form of primer is a brass case about 0.25 inches in diameter and 1.5 inches long. filled with priming composition. One of the principal factors in the rapid loading of modern guns is the improvement in the mechanism for opening and closing the breech. In all rapid fire guns the opening is effected in a second or less by the simple throw of a lever. In the interrupted screw type the first part of the lever movement operates a worm or toe which revolves the breech-plug and the second part of the movement retracts it and turns it clear of the breech. The mechanisms used in large guns of of United States navy are the Fletcher and Vickers-Maxim. The three-pounder and six-pounder semi-automatic guns are fitted with the Hotchkiss vertically sliding breech block; the three-inch, which also has semi-automatic action, has a modified Fletcher mechanism.

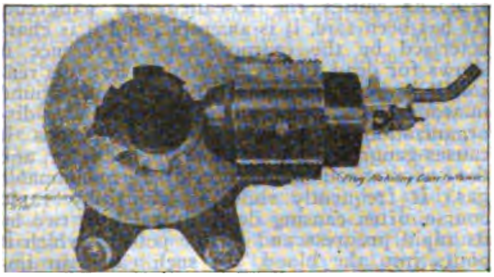
In United States guns of more than seven-inch calibre the plug is operated on the Fletcher system, but instead of using a light lever the rotation and retraction are effected by turning a crank. In some recent installations, heavy springs (compressed during recoil) are employed to facilitate the opening and closing movements. By the use of these springs, the operation of a large plug is made almost as quick and easy as that of a seven or seven and one-half inch — the largest of the true rapid fire guns in any navy. To prevent injury to the threads of the screw-box, all guns with a screw breech are fitted with a loading tray that covers the lands on the lower side of the screw-box sufficiently to prevent the projectile from striking or rubbing them during the operation of loading. In guns of 6-inch calibre or less the loading tray is placed by hand or automatically. In large guns it is usually hinged on one side of the breech and operated by a lever.

The mounts of recent heavy naval guns are controlled by hydraulic or electric power or a combination of the two. The sleeve or slide in which the gun recoils is pivoted below the gun port in such a manner as to permit of high elevation (20° to 30°) with a very small port opening. When three guns are installed in one turret, arrangemnt is made for the central gun to be fired a small fraction of a second later than the others if all are be fired in one salvo. The opening and closing of the breech and handling of the charge and projectile are so far assisted by quick working mechanism as to approach automatic working and the loading interval is cut to 20 seconds or less for guns of largest size.

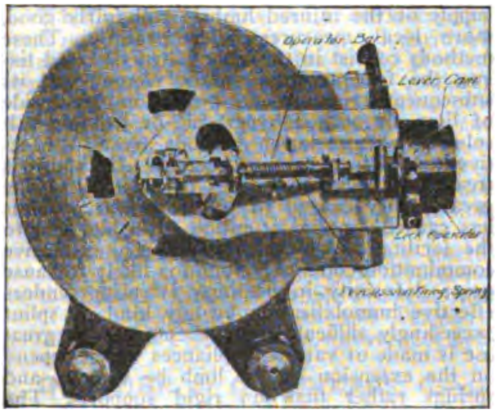
Lewis Sayre Van Duzer,
Captain in the United States Navy, ex-Secretary of the United States Naval Institute.



Breech closed, ready to revolve plug and lock it. (From rear).



Breech open. (From rear).



Breech closed and locked. (From rear).

United States Navy 5-in. Breech Mechanism.

(From Textbook on Naval Ordnance, by permission of United States Naval Institute).

Table of Naval Guns

Calibre of gun (inches)	Length of gun (calibres)	Weight of gun (tons)	Weight of shell (lbs.)	Muzzle velocity of projectile (ft. sec.)	Muzzle energy of projectile (ft. tons)
Austria:					
14.96	45	79.3	1,477	2,979	91,103
14	45	69.0	1,212	2,979	69,976
12	45	53.5	992	2,625	47,400
9.45	45	27.1	474	2,625	22,910
7.48	42	12.1	198	2,625	10,025
5.9	50	7.1	100.3	2,887	5,760
4.72	40	2.1	52.4	*	*
3.94	50	1.9	30.4	2,952	1,840
France:					
13.38	45	66	1,190.5	2,675	65,345
12.0	50	*66	970	2,870	55,180
10.8	45	35.1	562.2	2,675	27,880
9.45	50	30.0	485.0	2,870	27,590
7.63	45	15.0	189.6	3,035	14,520
6.46	45	8.1	114.6	2,940	6,940
5.45	50	*	77.2	*	*
3.94	55	2.2	35.3	*2,625	*
Germany:					
15.0	45	82.5	1,675.5	*2,920	*99,000
12.0	50	52.2	859.8	*3,080	*56,485
11.02	50	40.4	661.4	3,080	43,725
9.45	40	25.2	418.9	2,765	22,215
8.26	45	15.2	275.6	2,940	16,410
6.7	40	7.5	154.3	2,785	8,275
5.9	45	5.0	101.4	2,920	5,990
4.13	40	1.7	35.2	2,755	1,860
Great Britain:					
18.0	*40	*	*3,000	*2,300	*
15.0	40	85.0	1,920	2,360	74,130
13.5	45	76.0	1,250	2,700	63,190
12.0	50	66.0	850	3,000	53,400
10.0	45	32.5	500	2,800	27,200
9.2	50	28.0	380	3,000	23,000
7.5	50	16.0	200	3,000	12,500
6.0	50	8.7	100	3,000	6,200
4.0	50	2.0	31	3,000	1,930
Italy:					
15.0	46	97.0	*1,900	2,500	*82,340
12.0	46	57.6	920	2,820	49,375
10.0	45	36.2	500	2,800	27,180
8.0	45	18.0	250	2,845	14,000
7.5	45	14.0	200	2,900	11,500
4.7	50	3.3	50	3,000	2,800
Japan:					
14.0	45	80.2	1,400	2,615	66,385
12.0	50	66.7	850	3,000	53,045
10.0	50	38.2	500	3,000	31,200
8.0	45	18.5	250	2,430	10,650
6.0	50	8.7	100	3,000	6,240
4.7	50	3.3	45	3,000	2,810
United States:					
16.0	50	*	*2,100	*2.800	*
14.0	45	63.4	1,400	2,600	65,686
12.0	50	56.1	870	2,950	52,483
8.0	45	18.7	260	2,750	13,360
7.0	45	12.7	165	2,700	8,338
6.0	50	8.6	105	2,800	5,707
5.0	51	4.6	50	3,150	3,439
4.0	50	2.6	33	3,000	2,058

Note.— These tables include all the high-powered guns of large calibre placed on board ship 1910–1914. Such details of later guns of the United States and allies as have been given out for publication since 1914 are added. Details of recent Austrian and German guns are derived from various sources and are regarded as approximately reliable except as regards muzzle velocity and muzzle energy, which are believed to be much over estimated. It is doubtful if either the Austrian or German navies are using muzzle velocities in excess of 2,800 f.s. An asterisk (*) indicates that the figures are unknown or approximate only.

GUNS, Strategy. See GUNNERY.

GUNSAULUS, gŭn-sâl'lŭs, **Frank Wakeley**, American clergyman and educator: b. Chesterville, Ohio, 1 Jan. 1856. He was graduated at the Ohio Wesleyan University in 1875, was ordained to the Methodist ministry, but became a Congregationalist. He was pastor of Congregational churches at Columbus, Ohio (1879–81), Newtonville, Mass. (1881–85), and Baltimore, Md. (1885–87). In 1887 he became pastor of Plymouth church, Chicago, and from 1899 of the Central church of that city. Since 1893 he has been president of the Armour Institute of Technology, Chicago. He became widely known as a preacher and lectured on 'Savonarola' and 'John Hampden.' In 1908 he received the degree of D.D. from the Ohio Wesleyan University and LL.D. from Marietta College. He has published: 'Monk and Knight' (1891); 'Phidias' (1893); 'Gladstone' (1898); 'The Man of Galilee' (1899); 'Paths to Power' (1905); 'Higher Ministries of Recent English Poetry' (1907); 'The Ministry and the Spiritual Life' (1913); etc.

GUNSHOT WOUND. The chief causes of wounds in modern warfare are small-arms bullets, shrapnel balls, fragments of shell, and grenades. Rifle bullets are of a roughly conical shape, and are generally made with a lead core and a German silver or steel jacket. They have, besides their motion of progress, a very rapid motion of rotation, due to the fact that they are fired from a rifled barrel, and a movement of oscillation, which is especially well developed in the sharply pointed bullets used by the United States, France, Germany and Turkey. The oscillatory movement is strongest at the beginning of the course of the bullet, so that up to about 550 yards the bullet has a quasi-explosive action, lacerating and comminuting all tissues in its path. It breaks into pieces, and the jacket and core become separated. Beyond 550 yards the bullet will normally make a clean hole where it hits, and a clean, but larger hole of exit. However, if it hits a bone, it still tends to shatter and splinter it. At extreme ranges, the bullet has rather a bruising than a perforating action. A bullet which hits the ground and ricochets will probably be deformed and will almost certainly hit side on, or even rear on. It furthermore often sends a shower of sand and gravel as secondary projectiles. The result is a large lacerated wound which will in all probability be infected by fragments of clothing carried in ahead of the projectile. On the other hand a bullet striking point on will generally cause a wound either entirely aseptic or so slightly septic that the tissues can take care of the germs introduced without any aid. Furthermore, while the wound of a bullet striking point on will often be confined to the destruction of tissue in the path of the bullet, a ricochet wound will contain a large amount of disorganized tissue forming an excellent nidus for pyogenic and pathogenic infection. Shrapnel consists of a casing containing closely packed lead balls and a small explosive charge set off by a time fuse. The velocity of these balls is low compared to that of a rifle bullet, and their size is considerably greater. Accordingly the wound which they make is less clean cut than that of a rifle bullet, and the surrounding tissues are bruised and crushed. Infection by clothing is also highly probable. The modern high explosive shell is a case of steel which is completely disrupted by the explosion of the contained charge of high explosive. The violence of this disruption may cause severe injury or even death without any externally visible lesion. The proximate cause of the injury in such cases is the sudden disturbance of the pressure within the tissues, which often engenders internal hemmorrhages in the vital organs. Wounds from shell fragments bear a general similarity to those from deformed rifle bullets in the lacerating character of the injury and the almost invariable presence of infection. They gain an added seriousness from the fact that the shell fragments are often much larger than a bullet and that a large number of fragments are likely to cause wounds at the same time. Wounds caused by hand and rifle grenades, trenchmortar and airplane bombs, etc., bear a general similarity to shell wounds. The infection of war wounds is of two sorts — pyogenic and pathogenic. The pyogenic bacteria are those familiar in civil practice. The two chief pathogenic bacteria are *Bacillus tetani* and *B. perfringens.* Both are anærobic, and their frequent occurrence in the wounds of the Great War is due to richly manured nature of the Flanders soil. *B. tetani* is the germ of lockjaw, while *B. perfringens* causes the so-called gas gangrene. As has been said, it is anærobic, and it is characterized by the extraordinary preference it shows for dead and dying tissue. For this reason it is most frequently and virulently found in wounds where there has been extensive disorganization of tissue. In these wounds it causes gangrene, putrefaction, intense fetor, and the subcutaneous generation of an inflammable gas. It frequently runs a frightfully rapid course, often causing death in a day or two by its rapid progress and by the poisons which it pours into the blood. In such cases an immediate high amputation, leaving the end of the stump freely exposed to the air, offers the only hope. In less rapid cases, where the blood supply of the injured limb is still fairly good, more local measures offer promise. These methods consist in the removal of diseased tissue, the free aeration of the wound, and its subsequent irrigation with a solution of chloride of lime, or with a hypertonic or isotonic salt solution. These latter methods are also effective against pyogenic bacteria. Tetanus is treated by preventive doses of antitoxin. The great injury caused to bones in war wounds has caused especial attention to be devoted to the facilitation of their repair. The extensive comminution commonly found is likely to cause great deformity in healing. It also renders effective immobilization by any kind of splint exceedingly difficult. For these reasons great use is made of various appliances which depend on the extension of the limb by weights and springs rather than on rigid supports. The use of plates attached to the bones is generally discountenanced on account of the additional injury thereby caused to the bone circulation. Bone fragments are conserved as far as possible as nuclei for callus formation. In cases where an irreplaceable loss of bone has occurred, grafting is frequently employed. Wounds of the viscera are fatal in an enormously smaller percentage of cases nowadays than in former times, when a perforation of the intestines was practically equivalent to a death-warrant. The antiseptic and aseptic methods of modern surgery are very often successful. Head wounds, which are especially frequent in trench warfare, are often much more serious than they appear on the surface. What seems to be a mere graze of the scalp and skull may involve the fracture and depression of the lower table. The blood vessels and nerves are frequently involved in gunshot wounds. The high velocity of modern projectiles, together with their small size, has made especially frequent the formation of false aneurisms of various types from wounds of arteries and veins. These are generally treated by ligation, provided there is an adequate collateral circulation. Nerve wounds are very slow in healing, for they only heal by the growth of new axis-cylinders into the distal part of the cut nerve. However, surgical methods make this regeneration possible even where a considerable part of the nerve is lost. Electrical method is often used later. The question whether a projectile should be left in a wound or not depends on whether the wound is infected, and on whether the projectile causes pain and irritation or not. Often the removal of a tolerated foreign body in a healed wound will waken a latent infection into renewed activity, and cause serious results. Consult Groves, E. W. H., ‘Gunshot Injuries of Bones’ (London 1915); Penhallow, D. P., ‘Military Surgery’ (London 1916); Stevenson, W. F., ‘Wounds in War’ (New York 1898).

GUNTER, Edmund, English mathematician: b. Hertfordshire, 1581; d. London, 10 Dec. 1626. After studying at Westminster School and at Christ Church, Oxford, he took the divinity degree. However, the study of mathematics was more congenial to him, and he gave up all thought of a career in the church in order to devote his time to that work. In 1619, he became professor of astronomy at Gresham College, London, where he continued until his death. Several important inventions bear his name: Gunter's chain, an instrument used in surveying; Gunter's line, a logarithmic ruler, which is of great value in the practical application of logarithms; Gunter's quadrant, a portable instrument for ascertaining the hour of the day, the sun's azimuth, etc.; and Gunter's scale, an instrument for solving problems in navigation. To him also has been attributed the discovery that the declination of the magnetic needle is subject to variation. Gunter's discoveries are described in ‘Sector, Cross-Staff, Bow, Quadrant and Other Instruments.’ He published also ‘New Projection of the Sphere’ (1623); ‘Canon Triangulorum, or Table of Artificial Lines and Tangents’ (1620). In 1624 his collected works were published.

GUNTHER, or GUNTHERUS, German theologian and poet of the 12th century. After acting in the capacity of tutor to Prince Konrad, son of Frederick Barbarossa, he entered the Cisterian Convent of Paris in Alsace. His surviving works consist of the Latin epic entitled ‘Ligurinus,’ and a fragment dedicated to Frederick Barbarossa of a Latin epic ‘Solimarius.’ The former describes the deeds of Frederick in Italy and is of great value as a description of the life of that era. Consult Pannenborg, A., ‘Der Verfasser des Ligurinus’ (Göttingen 1883).

GÜNTHER, Albert Charles Lewis Gotthilf, English zoologist: b. Esslingen, 1830; d. 1914. After studying at the universities of Tübingen, Berlin and Bonn, he received an appointment as assistant in the zoological department of the British Museum 1856. He became director in 1875 and remained in that capacity until his retirement in 1895. From 1875–76 he was president of the Royal Society; and from 1898–1901, of the Linnean Society. He was editor and founder of the ‘Record of Zoological Literature’ in 1864, and coeditor of the *Annals and Magazine of Natural History*. Among his publications are ‘Medizinische Zoologie’ (1858); ‘Catalogue of the Batrachia Salientia and Fishes in the British Museum’ (10 vols., 1858–70); ‘The Gigantic Land-Tortoises, Living and Extinct’ (1877); ‘Introduction to the Study of Fishes’ (1880); ‘Fische der Südsee’ (1873–1910); ‘Reptiles and Batrachians of Central America’ (1885–1902).

GÜNTHER, Anton, Catholic theologian: b. Lindenau, Bohemia, 17 Nov. 1783; d. Vienna, 24 Feb. 1863. He was educated in law, but abandoned that profession in order to enter the priesthood (1820). He devoted his life work to the reconciling of reason and religion, basing his conclusions on subjective reasoning. His ideas on the subject are set forth in his ‘Vorschule zur spekulativen Theologie des positiven Christentums’ (1828), and in ‘Der letzte Symboliker’ (1834). To the younger students of Catholicism, Günther's ideas made an effective appeal, and he gained a considerable following. His attempts to apply the philosophic method to the study of his religion antagonized the scholastic element in the church, and his books were frequently and bitterly opposed, and finally placed on the index of forbidden literature. His works were collected and published at Vienna in 1882. Consult the biography by Knoodt (Vienna 1881).

GUNTHER, Archibald Clavering, American novelist and dramatist: b. Liverpool, England, 25 Oct. 1847; d. New York, 23 Feb. 1907. While he was quite young his parents went to California. There he studied engineering in the State University. For six years he worked as a mining engineer; then for three years (1875–78) he was a stockbroker in San Francisco. In the meantime he had been devoting his spare time to literature. Finally he decided to go to New York and try his luck there. But he did not find the publishers anxious to publish his novels. ‘Mr. Barnes of New York’ went the rounds of practically all of them. Finally, on its publication in 1887, it met with almost instant and unexpected success, outselling all other novels of the year. This was followed in 1888 by ‘Mr. Potter of Texas,’ which met with similar success. From this on Gunther kept busy turning out novel after novel, interspersed with a play now and then; and he succeeded in retaining his popularity with a large class of his readers until his death. From a literary point of view Gunther's novels are not of a very high class; but they are rich in situation and rapid movement of plot. His characters though inclining more to be types than real creations, display a certain originality and freshness which are inviting. Gunther was one of the first of American writers to sound the national note. In this he has been followed by many imitators, most of whom have improved on his English, but few of whom have equalled him in the rapid movement of his characters. His novels include, in addition to those already mentioned, ‘That Frenchman’ (1889); ‘Miss Nobody of Nowhere’ (1890); ‘Baron Montez of Panama and Paris’ (1893); ‘Jack Curzon’ (1898); ‘Adrienne de Portalis’ (1900); ‘A Manufacturer's Daughter’ (1901); ‘My Japanese Prince’ (1904); ‘Madame Touraine’ (1905); ‘A Prince in the Garret’ (1905); ‘Dr. Burton’ (1906). Among his dramas are ‘Courage’; ‘Prince Karl’; ‘The Deacon's Daughter’; ‘Mr. Barnes of New York’ and ‘Mr. Potter of Texas.’ Of his dramas, the two last mentioned and ‘Prince Karl’ were the most successful.

GÜNTHER, Johann Christian, German poet: b. Striegau, Lower Silesia, 8 April 1695; d. Jena, 15 March 1723. He was intended for the profession of physician by his father, but proved unadapted to that study and abandoned it for literature. His poem on the Peace of Passarowitz (1718) brought him into prominence and he was recommended by Mencke to Frederick of Saxony (Augustus II, king of Poland). But his dissolute habits failed to gain him the patronage of that monarch and he wasted away the few remaining years of his life in dissipation. His works are characterized by a flowing lyric quality, unconventionality, cleverness and sparkling wit, sometimes dimmed by bad taste and vulgar joking. His collected poems appeared at Breslau in four volumes (1723–35). They are also preserved in Tittman, ‘Deutsche Dichter des 17ten Jahrhunderts’ (Leipzig 1874) and by Fulda in Kürschner's ‘Deutsche Nationalliteratur’ (Vol. XXXVIII, 1883). Consult Kalbeck, M., ‘Neue Beiträge zur Biographie des Dichters C. Günther’ (Breslau 1879); Litzmann, ‘Zur Textkritik und Biographie Johann Christian Günther’ (Frankfort 1880).

GÜNTHER, Johann Heinrich Friedrich, German veterinary surgeon: b. Kelbra, 1794; d. Hanover, 1858. He received his education at Jena and Berlin, and specialized in the study of contractures. In 1847 he became director of the veterinary college at Hanover, which office he held until his death. Together with his son he made important studies in the dental diseases of animals, which were published under the title of ‘Über gesunde und kranke Zähne des Pferdes,’ an appendix to ‘Die Beurteilungeslehre des Pferdes’ (1859). He also wrote some important treatises on pulmonary diseases of animals. Among his other works may be mentioned ‘Lehrbrech der praktischen Veterinärgebrurtshilfe’ (1830); ‘Das Gangwerk der Pferde’ (1845); ‘Lupinenbau’ (1857).

GÜNTHER, Karl Wilhelm Adalbert, German veterinary doctor, son of the preceding: b. Hanover, 1822; d. there, 1896. After studying at Berlin he taught in the veterinary school at Hanover and succeeded his father as director in 1870. Besides the work which he undertook with his father, Günther published ‘Topographische Myologie des Pferdes’ (1866); ‘Die Wutkrankheit der Hunde’ (1880); ‘Das Kapaunen rote Hähne’ (1890); ‘Studien über das Kehlkopfpfeifen der Pferde’ (1894).

GÜNTHER, gün'tĕr, **Siegmund,** German geographer and mathematician: b. Nuremberg, 6 Feb. 1848. Educated at several German universities he became professor of geography and later prorector in the School of Technology at Munich in 1886. He has made valuable contributions to the history of mathematics and to the history of geography. Among his many valuable professional works may be named ‘Lehrbuch der Determinatentheorie’ (1875); ‘Untersuchungen zur Geschichte der mathematischen Wissenschaften’ (1876); ‘Der Einfluss der Himmelskörper auf Witterungsverhältnisse’ (1876; 2d ed., 1884); ‘Grundlehren der mathematischen Geographie und Astronomie’ (1878; 3d ed., 1893); ‘Die Lehre von den gewöhnlichen und verallgmeierten Hyperbelfunktionen’ (1881); ‘Parabolische Logarithmen und parabolische Trigonometrie’ (1882); ‘Lehrbuch der Geophysik und physikalischen Geographie’ (1884–85); ‘Die Meteorologie ihrem neuesten Standpunkt gemäss dargestellt’ (1889); ‘Lehrbuch der physikalischen Geographie’ (1891); ‘Das geschichtliche Element beim Mathematischen Unterricht’ (1893).

GÜNTHER VON ANDERNACH, än'dĕr-nätt, German physician: b. Andernach, Prussia, 1487; d. 1574. After studying at Utrecht and Marburg he became professor of Greek at Louvain. Soon after he entered the University of Paris and pursued the study of medicine. Upon completing this course, he was appointed physician to Francis I. Religious persecution forced him to seek refuge at Strassburg where he established a large practice and won considerable recognition. He is the author of a treatise on anatomy in Latin entitled ‘Anatomicarum Institutionum Libri Quattour’ (1536).

GUNTON, George, American economist: b. Cambridgeshire, England, 8 Sept. 1845. He came to the United States in 1874 and until 1880 was a writer on economic subjects. He then turned his attention to sociological and economic work, and in 1890 became president of the Institute of Social Economics and editor of the *Social Economist,* which in 1896 became *Gunton's Magazine.* In 1899 he became international examiner and director of the economic and sociological work of the Young Men's Christian Association of North America. His publications include ‘Wealth and Progress’ (1887); ‘Principles of Social Economics’ (1891); ‘Trusts and the Public’ (1899); ‘Outlines of Political Science’ (1900); ‘Outlines of Social Economics’ (1900), and several monographs on economic subjects.

GUNTOWN, Battle of. After General Forrest's capture of Fort Pillow, 12 April 1864, General Sturgis was ordered to march from Memphis to intercept him, but before the expedition got fairly under way it was ascertained that Forrest had fallen back to northern Mississippi. On 1 June Sturgis started from White's Station, near Memphis, with about 5,500 infantry and artillery, under Colonel McMillan, and 3,400 cavalry, under General Grierson, to defeat Forrest and prevent his interference with Sherman's advance on Atlanta.

Moving southward, Sturgis reached Ripley, 80 miles from Memphis, on the 8th and on the 10th struck the Mobile and Ohio Railroad near Guntown, Miss., where Grierson, in advance with the cavalry, met Forrest's cavalry near Brice's Crossroads and became immediately engaged. Sturgis, who was six miles in rear with the infantry, moved on the double-quick, followed by a train of 250 wagons and, coming to where Grierson was engaged, without giving his exhausted men a moment's rest and badly handling them threw them into the fight. In three hours' time Forrest routed him, drove him from the field in confusion, captured prisoners, guns and wagons, and closely pursued him to near Ripley. There, early on the morning of the 11th, his rear guard, taking advantage of a small stream, after a sharp fight checked Forrest, and Sturgis continued his retreat to Memphis, having lost 23 officers and 594 men killed and wounded, 1,623 prisoners, 14 guns and his entire train of 250 wagons, with 10 days' rations and a large supply of ammunition. Forrest's engaging force did not exceed 4,000 men; his loss was 492 killed and wounded. Consult 'Official Records' (Vol. XXXIX).

GURA, goo'rȧ, **Eugen**, German operatic star: b. Pressern, 1842; d. Bavaria, 26 Aug. 1906. He studied painting at Vienna and Munich, but later devoted himself to music, studying at the conservatory at Munich. He starred principally in Wagnerian opera and later on the concert stage. Gura sang at Breslau, Leipzig, Hamburg and London, and was a member of the Munich Opera from 1883 until his retirement in 1902. In 1906 his autobiography appeared at Leipzig under the title 'Erinnerungen aus meinem Leben.'

GURJUN (gėr'jŭn) **BALSAM, or WOOD OIL**, the juice or liquid of the *Dipteraceæ* which grows in the Andaman Islands. It resembles copaiba balsam, and has at various times been sold as such. Its chief use in the East is as a varnish for boats and for preventing the attacks of ants on timber. It was used for the checking and alleviating of leprosy by the late Father Damien among the lepers of Molokai, in Hawaii.

GURKHAS, goor'kaz. See GHURKAS.

GURKO, goor'kō, **Ossip Vladimirovitch**, Russian soldier: b. 15 Nov. 1828; d. 28 Jan. 1901. He took part as captain in the Crimean War and as lieutenant-general commanded the Russian advance-corps which at the beginning of the war with Turkey crossed the Danube and seized Tirnova (July 1877). In the same year he captured Gorny Dubnik and Telish, and on 15–17 Jan. 1878 defeated Suleiman Pasha at Philippopolis. He was governor-general of Saint Petersburg in 1879–80, of Poland in 1883–94, and in 1894 was retired with field-marshal's rank. He was among the foremost Russian generals of recent times.

GURLITT, goor'lĭt, **Cornelius**, German composer: b. Altona, 1820; d. 1901. After studying composition with Reinecke (the elder), and later with Weyse at Copenhagen, he became in 1864, organist of the Hauptkirche in his native city. He served as musical director of the army during the Schleswig-Holstein campaign and was appointed royal director of music in 1874. Gurlitt's compositions for the pianoforte are the best known of his works, which include also pieces for the violin, 'cello, vocal duets, string quartets and several operas and operettas.

GURLT, goorlt, **Ernest Friedrich**, German veterinary doctor: b. Drenktau, 1794; d. 1882. He was educated at Breslau; became instructor at Berlin in the Department of Veterinary Surgery (1826–70), and director of the technical department there (1862–82). His principal research concerned the anatomy and deformities of domestic animals. Among his publications are 'Handbuch der vergleichenden Anatomie der Haussäugetiere' (1821; 7th ed. 1890); 'Lehrbuch der pathologischen Anatomie der Haussäugetiere' (1831–32, and again 1849); and 'Anatomy of the Horse' (Eng. trans. by J. Willimott, 1833).

GURLT, Ernst Julius, German physician: b. Berlin, 1825; d. 1899. He studied at Berlin, and became professor there in 1862. His publications include works on medical statistics and on surgery. Among them are 'Handbuch der Lehre von den Knochenbrüchen (2 vols., 1862–64); 'Leitfaden für Operationsübungen am Kadaver' (1862); 'Zur Geschichte der internationalen und freiwilligen Krankenpflege im Kreig' (1873); 'Die Geenkresektionen Nach Schussverletzungen' (1879); 'Geschichte der Chirurgie und ihre Ausübung' (3 vols., 1898). He was also editor of *Kriegerheil*, the journal of the German Red Cross Association (1867–98), and 'Biographische Lexikon der hervorragenden Aertze aller zeiten und Völker' (6 vols., 1884–88).

GURNARDS, gėr'nȧrdz, a family of teleost fishes (*Triglidæ*) occurring in all warmer seas, resembling somewhat the sculpins in the rough spiny bones of the skull, but differing in having the body regularly scaled or covered with bony plates. The fantastic sea-robins (*Prionotus*) are common representatives on our coasts. Closely allied are the flying-gurnards (family *Cephalacanthidæ*) of the warmer seas, in which the pectoral fins are very long, enabling the fish to flutter a short distance in the air.

GURNER, Ross Sterling, American artist: b. Westport, N. Y., 29 June 1847; d. Nassau, Bahamas, 12 Feb. 1915. He was educated at Dickenson Seminary, Williamsport, Pa. He was one of the head draughtsmen in the United States Patent Office 1874–76, when he resigned and went to Europe to study painting in Munich, Venice, Florence and Rome, and upon his return, settled in Boston. He was instructor in water colors at the Massachusetts Institute of Technology for 30 years, and at the Boston Normal Art School for five years. He was one of the directors of the Boston Public School Art League in 1898, and was the originator of the movement for school room decoration. He wrote 'On the Use of Water Colors' (1886); 'Art for the Eye School Room Decoration' (1898). He was a member of the board of aldermen of Salem in 1894. He was at one time on the board of government of the Boston Art Club, and of the Boston Art Students Association. Some of Mr. Gurner's notable works were 'A Small Court, Mexico'; 'El Jardin Modesto'; 'A Painted Ship'; 'The Flying Dutchman';

'A Bermuda Wedding'; 'The Golden Galleon'; 'The Rover'; 'Le Soliel Royal'; 'The Three Decker'; he was awarded the silver medal for water colors, Pan-American Exposition, Buffalo, 1901; and Evans prize A. W. C. S. 1908; First prize, Water Color Society, New York, 1898. First silver medal, Mechanics Fair, Boston, 1890.

GURNEY, Edmund, English philosopher: b. Hersham, 1847; d. Brighton, 1888. He was graduated at Trinity College, Cambridge, with high honors and studied music for many years. On this subject he wrote the 'Power of Sound' (1880). Later he studied medicine at Cambridge, but never practised. The subject of psychial experience had long interested him and he now began his researches in that field. To this vague topic of the supernormal he applied the exact methods of science and succeeded in arousing enough interest in the study to establish the Society for Psychical Research. Gurney's experiments in hypnotism and telepathy were published in the Proceedings of that organization. In spite of all misinterpretations of his theories, his work at least served to indicate that the subject of the psychical was worthy of rational analysis. He published also 'Tertium Quid' (2 vols., 1887), a collection of essays.

GURNEY, gėr'nĭ, Sir **Goldsworthy,** English inventor: b. Cornwall, England, 1793; d. 1875. He built a steam carriage in 1827, and was the first to devise and use the high-pressure steam-jet in locomotion. He invented the oxyhydrogen blow-pipe, and the Drummond light.

GURNEY, Joseph John, English Quaker philanthropist: b. Earlham Hall, near Norwich, England, 2 Aug. 1788; d. there, 4 Jan. 1847. He was a banker in Norwich and in 1818 became a preacher in the Society of Friends, and the same year accompanied his sister, Mrs. Elizabeth Fry (q.v.), on her tour to Scotland, having warmly taken up the benevolent cause to which she had devoted herself — the amelioration of the condition of prisoners. In 1827 the two made a journey to Ireland with the same object, and in 1837 Gurney visited the United States and Canada, where he was absent for nearly three years. He went with Mrs. Fry in 1841 to Holland, Belgium and Germany, and in 1842–44 visited France and Switzerland. The object of these journeys was to reform prison management, and effect the abolition of slavery in the French colonies, for which purpose he had interviews with Louis Philippe and M. Guizot. He was the author of 'Notes on Prisons and Prison Discipline' (1819); 'Observations on the Religious Peculiarities of the Society of Friends' (1824); 'Essays on the Evidences, Doctrines and Practical Operation of Christianity' (1827); 'Winter in the West Indies Described in Familiar Letters to Henry Clay of Kentucky' (1840).

GUROWSKI, goo-rôf'skē, **Adam de,** Count, a Polish scholar and author: b. Kalisz, 10 Sept. 1805; d. Washington, D. C., 4 May 1866. In early life he was a leading Polish patriot, and an instigator of the revolution of 1830. Later he became an advocate of Panslavism and was employed in Russia. In 1841 he left the latter country and in 1849 came to the United States, and from 1861 to 1863 was a translator in the State Department at Washington. Among his works, several of which were written in French and German, are 'Civilization and Russia' (1840); 'Panslavism' (1848); 'Russia as It Is' (1854); 'The Turkish Question' (1854); 'America and Europe' (1857); 'My Diary: Notes on the Civil War' (1862–66).

GURU, goo'roo, among the Hindus, a spiritual preceptor, to whom is entrusted the religious training of youths and the performance of religious rites for those boys who have not attained the age requisite for participation in these ceremonies. In some instances the guru has also temporal authority, as among the Sikhs.

GURWOOD, John, British soldier: b. 1790; d. 1845. He served in Wellington's army, was wounded at Cuidad Rodrigo (1812), and later became brigade-major of the Guards' cavalry. He was wounded again at Waterloo and later was raised to the rank of lieutenant-colonel, and was brevetted colonel in 1841. As private secretary to the Duke of Wellington he was commissioned to the task of collecting the "Wellington Despatches," which are most valuable in the study of the history of the period. For this work he received an annuity of £200 from the government.

GUSMAO, goos'må-ō, **Bartholemeu Lourenço de,** aeronaut: b. Santos, Brazil, 1685; d. Toledo, 19 Nov. 1724. He studied theology at the University of Coimbra in Portugal. He had a passion for the physical sciences, and in 1708 began the construction of an aeronautical device. On 8 Aug. 1709 he launched it from the tower of the Casa da India at Lisbon, in the presence of the king, John V. We have no detailed information either as to the nature of the mechanism employed, which was said to involve, beside the action of the wind, electric and magnetic forces, nor as to the results of the experiment. As a prize for his invention, he was raised to the rank of canon, and received a benefice of 600,000 reis. He then devoted himself to shipbuilding and historical research. In 1724 he left Portugal because he had been suspected of sorcery. Besides several sermons he published 'Varios Modos de esgotar sem gente as naus que fazem agua' (Lisbon 1710).

GUSSENBAUER, gu'sĕn-bow'ėr, **Karl,** Austrian surgeon: b. Carinthia, 1842; d. 1903. After studying at Vienna, he occupied the chair of Surgery at Liège (1875); three years later he was appointed to a similar post at Prague and in 1894 at Vienna. His researches were principally in the surgery of the larynx, partial resection of the intestines and artificial bone severance. The invention of the first serviceable artificial larynx is due to his work. He wrote several treatises on surgery, including 'Die traumatischen Verletzungen' (1880); 'Sephthämie, Pyohamie, und Pyo-Sephthämie' (1882); 'Beitrag zur Extirpation von Beckenknochengeschwülsten' (1891).

GÜSSFELDT, Paul, powl güs'fĕlt, German explorer: b. Berlin, 14 Oct. 1840. He studied science and mathematics between 1859 and 1865 in Berlin, Heidelberg, Giessen and Bonn. The German African Company sent him out on an expedition in 1872 to explore the Loango coast.

He was shipwrecked near Freetown, Liberia, (14 Jan. 1873), and landed at the mouth of the Kongo. He established a coast station but owing to the loss of equipment was unable to proceed into the interior and returned to Germany in 1875. He has given an account of this expedition in the work 'The Loango Expedition' (1879), which he wrote in collaboration with his fellow travelers Falkenstein and Pechuel-Loesche. In 1876 he explored the Arabian Desert, and in September 1882 he visited South America. Among the Andes he discovered a vast area of glaciers, in lon. 34° 30′ S. He climbed the highest peak of the volcanic range of the Andes (21 Feb. 1882) and reached the edge of the crater of Maipó, and during April and May of the same year explored the lofty plateaus of Bolivia. He was appointed professor of physical geography in the seminary for Oriental languages in Berlin. He has published 'In den Hochalpen' (1893); 'Reise in den Anden von Chile und Argentinien' (1887); 'Der Mont Blanc' (1894); 'Kaiser Wilhelm's II Reisen nach Norwegen in den Jahren 1889–92' (2d ed., 1892).

GUSTAFSON, Gabriel Adolf, Swedish archæologist: b. Visby, 1853; d. 1915. After studying at the university at Upsala, he became connected with the Antiquarian Museum there. In 1900, he succeeded to the chair of archæology at the University of Christiania, and in the same year was appointed director of the Archæological Museum there. His researches in Viking remains are his most important work. His restoration of the Viking ship discovered at Oseberg is especially noteworthy. Gustafson was elected a member of the Royal Academy in 1903, and published in 1906 'Norges Oldtid,' which is a valuable source for the study of the archæology of Scandinavia.

GUSTAVUS (gŭs-tā'vŭs) **I** (commonly called GUSTAVUS VASA), king of Sweden: b. Lindholmen, 12 May 1496; d. Stockholm, 29 Sept. 1560. He studied at the University of Upsala, and entered the service of Sten Sture the younger, administrator of the kingdom, in 1514. Sweden had, by the union of Calmar, become subject with Norway to the crown of Denmark. The country was at this time divided into two parties. There was a Danish party headed by the Archbishop of Upsala, and a Swedish party, which upheld the independence of the country, headed by the administrator whom it had raised to power. Gustavus fought with distinction under Sture against the Danes in 1517 and 1518. He was one of six hostages sent by Sture as guarantee of the safety of King Christian II, but effected his escape and reached Lübeck in 1519. After wandering about for some time as a proscribed fugitive he took refuge in the mines of Dalecarlia, where he worked as a common laborer. After various adventures he attempted open resistance. Christian II was crowned at Stockholm on 4 Nov. 1520. On the 8th the leaders of the Swedish party, among whom was Gustavus' father, who had been invited to the coronation, were executed. By the beginning of 1521 Gustavus had raised a considerable force, driven the Danes from several positions, and excited a general insurrection in Dalecarlia. In April he defeated the Danes at Westeraas; in July he seized Upsala, and in August was named administrator of the kingdom by the states which had assembled at Wadstena. On 6 June 1523 he was elected king by the Diet of Strengnäs. In 1527 he obtained the exclusion of the bishops from the senate and effected their subjection to the civil power. He now openly professed Lutheranism, and was crowned by the Protestant archbishop of Upsala on 12 Jan. 1528. The Lutheran religion was formally established at a diet held at Orebro in 1529. In 1544 the states assembled at Westeraas declared the kingdom hereditary in his house. A war broke out with Russia in 1555, which was concluded by the Peace of Moscow, 2 April 1557. Consult Alberg, 'Gustavus Vasa and His Times' (1882); Watson, 'The Swedish Revolution under Gustavus Vasa' (1889).

GUSTAVUS II (GUSTAVUS ADOLPHUS), king of Sweden, grandson of Gustavus Vasa: b. Stockholm, 9 Dec. 1594; d. Lützen, Saxony, 16 Nov. 1632. He was trained to war under experienced generals, and at 16 took his place in the state council. Charles IX, the father of Gustavus, had been declared king to the exclusion of his nephew Sigismund, who, on accepting the crown of Poland during his father's lifetime, had abjured the Protestant religion. On the death of Charles, Gustavus succeeded him, with the consent of the states, as king-elect. Sweden was at this time at war with Denmark, and Gustavus was in command of the army. He chose for his chancellor and first councillor Axel Oxenstiern, a man 10 years his senior, and already eminent for his ability, who eventually proved himself to be one of the greatest of European statesmen. The war with Denmark was concluded through the mediation of England in 1613. A new enterprise at this time presented itself to the ambition of Gustavus — the throne of Russia was vacant and contested. A party favored the election of Charles Philip, the brother of Gustavus, and was supported by a Swedish invasion under General de la Gartie, who had penetrated to Novgorod; while the Poles, who had also invaded Russia, had reached Moscow. Michael Romanoff was, however, elected czar. Gustavus took a personal share in the Russian war, which continued for about four years after this election, and had made considerable conquests in Livonia and the neighboring provinces when peace was concluded at Stolbova in 1617. In 1620 he married Eleanora, sister of the elector of Brandenburg. The war with Russia was followed by war with Poland, which lasted nine years, and was concluded on advantageous terms for Gustavus by a six-years' truce in September 1629. He had made important conquests, which he was allowed to retain, in East Prussia.

His attention was now diverted from northern wars by the affairs of Germany. The oppression of the Protestants by Ferdinand II excited his sympathy. He was alarmed by the progress of Wallenstein, which threatened to extend the empire to the Baltic, and by leaguing himself with the Protestants of Germany he might hope for easier and more extensive conquests than by struggling single-handed against the northern powers. He named his daughter Christina heiress to the throne, embarked for Germany in May 1630, and landed with an army of 13,000 men in the island of Usedom on the coast of Pomerania. After repeatedly defeating the imperial generals and conquering a great part of Germany, he was killed in the battle of Lützen. Gustavus differed from some other great commanders in preferring a small well-ordered army to a large one, asserting that all over 40,000 men were an encumbrance. His character made him beloved by his soldiers, and he was served with a devotion which enabled him to effect great things with small means. The effects of the discipline he imparted to the Swedish army, and the prestige of success derived from his victories, were felt long after his death. His body was taken to Sweden. Consult 'Lives' by Dodge (1896); Droyson (1879); Fletcher (1891); Noel (1905); Johnston, C. H. L., 'Famous Cavalry Leaders' (1908); and Cambridge Modern History (Vol. IV, 1907). See THIRTY YEARS' WAR.

GUSTAVUS III, king of Sweden: b. Stockholm, 24 Jan. 1746; d. there, 29 March 1792. He was the eldest son of Adolphus Frederick, Duke of Holstein, who had been called to the Swedish Crown in 1743, and succeeded his father on 12 Feb. 1771. He found the country divided between two aristocratic factions, the adherents of France and Russia, known respectively as the Hats and Caps. He resolved to give the country a new constitution and to increase the power of the Crown. He instituted a new military order of Vasa in order to gain the good-will of the officers, and effected his purpose by means of a sham revolt, which enabled him to assemble troops, wherewith he surrounded the assembly of the states-general and forced them to accept his constitution, which, as it only circumscribed the privileges of the nobility, was generally popular. In 1788, when war had broken out with Russia, the nobles revenged themselves by inducing the states-general to refuse him supplies. The fidelity of the Dalecarlians enabled him to repulse the enemy. To free himself from the hostility of the nobles he determined on another *coup d'état,* which he executed on 3 April 1789, by causing the leaders of the opposition to be arrested and then passing a law extending the royal prerogative. He concluded peace with Russia by the Treaty of Varela in August 1790. The Swedes were opposed to an alliance with Russia, and a diet which Gustavus assembled at Gefle for the purpose of procuring supplies, though surrounded with troops, proved so refractory that he was obliged to dismiss it. The nobles long before this had formed a conspiracy against him and resolved on his death. Three of them took an oath to murder him, and drew lots which should carry out their intention. The lot fell on Captain Ankarström, who shot the king in the back at a masquerade given at the opera house at Stockholm, 16 March 1792. Gustavus was distinguished as an author. Consult Bain, 'Gustavus III and his Contemporaries' (1895).

GUSTAVUS IV (ADOLPHUS), king of Sweden: b. 1 Nov. 1778; d. Saint Gall, Switzerland, 7 Feb. 1837. He succeeded on the death of his father, Gustavus III, and on assuming power showed that he had inherited his father's hatred of the principles of the French Revolution, which he carried to the extent of fanaticism. In 1803 he made a journey to Germany to promote a union of the German princes against Napoleon. He was at Karlsruhe when the Duke D'Enghien was seized, and sent his aide-de-camp to Paris to protest against that act of violence. After the Peace of Tilsit he exposed himself to a war with Russia while he was at war with France, by refusing to join the continental blockade and opening his ports to England; and in 1808 he quarreled with England, his only ally. His internal policy was as bad as his external. His subjects were oppressed with taxes to support his wars, and had in return the humiliation of finding Pomerania in the possession of France, and Finland in that of Russia. A conspiracy was formed against him; he was deposed, and the Diet by a decree of 10 May 1809 declared his family forever incapable of succeeding to the crown of Sweden. His uncle, the Duke of Sudermania, was proclaimed king under the title of Charles XIII, and in the following year adopted as his successor, Bernadotte, prince of Pontecorvo. Gustavus died in poverty. He took the title of Colonel Gustafson, and has left, among other writings, 'Memoirs of Colonel Gustafson' (1823). Consult Kleinschmidt, 'Die Irrfahrten Gustavus IV Adolf von Schweden' (1888); Elkan, 'An Exiled King: Gustaf Adolph IV of Sweden' (Eng. trans., 1913).

GUSTAVUS (GUSTAV) **V,** king of Sweden: b. Dottningholm, 16 June 1858. He is the son of King Oscar II and Queen Sophia Wilhelmina. After studying at Upsala, he made a tour of Europe, and on his return, joined the army (1875). In 1892 he became lieutenant-general. In 1881 he married Victoria, daughter of Friedrich Wilhelm, Grand Duke of Baden, and Princess Louise of Prussia — Gustavus succeeded to the throne of Sweden on 8 Dec. 1907. Five sons were born to Gustav; the Crown Prince, Gustav Adolph (11 Nov. 1882) was married to Princess Margaret Victoria, daughter of Prince Arthur, Duke of Connaught, in 1905. For an account of the reign of Gustavus V and his policies see SWEDEN, HISTORY.

GUSTROW, gu'strō, Germany, a town in the grand duchy of Mecklenburg-Schwerin on the Nebel River, 20 miles south of Rostock on the railroad route from Lübeck to Stettin. There is an old castle dating from the 16th century; a parish church of the same era, containing some fine altar-pieces by Flemish painters; a 16th century town hall; a cathedral of the 13th century, with a large square tower. The gymnasium was established also in the 16th century. The music hall and theatre are modern buildings. The principal industries are the manufacture of machines, iron founding, the production of saws, bricks, beer, soap, sugar, mattresses and dyes. Trade is carried on in wool, butter, cheese, cattle and grain. A fair is held annually. Güstrow was founded in the 12th century, and, as the capital of the Wend district, was the seat of the princes of Wend. In the 16th and 17th century, the dukes of Mecklenburg-Güstrow had their residence there. Pop. 17,805.

GUTCHKOFF, gootch'kŏv, **Alexander Ivanovitch,** Russian politician: b. Moscow, 1862. He was educated in Moscow and abroad, became a justice of the peace at 27 and in 1891 took an active part in combating the great famine in the government of Nizhni Novgorod.

He next made a journey through Asia Minor and Manchuria. In the South African War of 1899 he joined the Boer army and was wounded in action. Returning to Russia he was elected a city councillor for Moscow and appointed a bank director. For a time he fought with the Macedonian revolutionaries against the Turks, and in the Russo-Japanese War acted as director of the Russian Red Cross organization. Captured by the Japanese at the battle of Mukden, he was soon released in an exchange of prisoners. As a member of the Duma, Gutchkoff was one of the chief founders of the Octobrist Party in 1905 and violently denounced the incompetence of the various grand dukes who held high positions merely on account of their relationship to the Imperial family. In the 1907 elections 153 Octobrists were returned to the Duma and Gutchkoff, their leader, became the real master of the Assembly. See RUSSIA — HISTORY; REVOLUTION.

GUTENBERG, goo'tĕn-bĕrg, **Johannes** or **Henne,** German inventor of printing with movable types: b. Mainz, about 1400; d. there, 23 Feb. 1468. Little or nothing is known of his early life. In 1434 he was living in Strassburg and in 1436 entered into a contract with one Andreas Dryzehn or Dritzehn and others, binding himself to teach them all his secret and wonderful arts, and to employ them for their common advantage. The death of Dryzehn, which happened about the end of 1438, broke off the undertaking of the company. About 1448 he returned to Mainz and soon formed a copartnership with Johann Fust or Faust, a rich goldsmith who furnished money to establish a press, in which the Latin Bible was first printed. This, the Mazarin Bible, begun about 1450 and finished about 1455, is the first book known to have been printed with movable types. After some years this connection was dissolved. Fust had made large advances, which Gutenberg was now called upon to repay; and as he either could not or would not do it, the subject was carried before the tribunals. The result was that Fust retained the press, which he improved, and continued to use in company with Peter Schöffer of Gernsheim. By the patronage of a counsellor of Mainz, Conrad Hummer, Gutenberg was again enabled to establish a press the following year, from which there issued the fine 'Catholicon' of 1460, and also the 'Letters of Indulgence' of 1454 and 1455. Gutenberg's name does not appear in any production of his press, nor do his friends and patrons mention him in connection with the invention of printing. Consult Van der Linde, 'Gutenberg' (1878), and 'Geschichte der Erfindung der Buchdruckerkunst' (1886); Hessel, 'Gutenberg: Was He the Inventor of Printing?' (1882); 'Haarlem the Birthplace of Printing not Mentz' (1887); Gordon Duff, 'Early Printed Books' (1893).

GUTHE, goo'tĕ, **Karl Eugen,** American scientist: b. Hanover, Germany, 5 March 1866; d. 10 Sept. 1915. After studying at Strassburg, Berlin and Marburg, he emigrated to the United States in 1892. He instructed in physics at the University of Michigan and then removed to Iowa State College. In 1909 he became professor of physics at Michigan and dean of the graduate department in 1912. His publications include 'Manual of Physical Measurements' (1902); 'Laboratory Exercises with Primary and Storage Cells' (1903); 'Textbook of Physics' (1908); 'College Physics' (1911, with J. O. Reed), and 'Definitions in Physics' (1913).

GUTHRIE, gŭth'ri, **George Wilkins,** American ambassador: b. Pittsburgh, Pa., 5 Sept. 1848; d. Tokio, Japan, 8 March 1917. After studying at the Western University of Pennsylvania and at George Washington University he practised law at Pittsburgh. From 1906–09 he was mayor of that city and in 1913 was appointed Ambassador Extraordinary and Plenipotentiary to Japan by President Wilson, in which capacity he served until his death. Guthrie was awarded honorary degrees by the University of Pittsburgh and Trinity College.

GUTHRIE, James, American lawyer: b. near Bardstown, Ky., 1792; d. 1869. After studying at the Bardstown Academy, he secured a position with a trading firm operating on the Mississippi. Later he studied law and practised in his native city. In 1820 he moved to Louisville, where he had been appointed attorney for the Commonwealth. He sat in the State legislature for 15 years, serving in the senate for the last six years of that period. Guthrie received the appointment of president of the State Constitutional Convention in 1849; and in the cabinet of President Franklin Pierce was Secretary of the Treasury. His efforts contributed much to Kentucky's decision to stand by the Union. At the Democratic Convention of 1864 Guthrie was a delegate, and from 1865 to 1868 he was a member of the United States Senate.

GUTHRIE, SIR James, Scottish painter: b. Greenock, near Edinburgh, 10 June 1859. He received his education at Glasgow University and then undertook the study of painting. He went first to Edinburgh and then to London, where he came under the influence of John Pettie; next he studied at Paris. After gaining recognition for his paintings on the Continent, he returned to Scotland, where, in 1892, he was elected a member of the Royal Scottish Academy. Guthrie's early pictures were of landscape and genre, characterized by thick and heavy coloring. However, about 1890 he abandoned these subjects and painted portraits exclusively, and his coloring, while vivid, became lighter. In 1902 he succeeded Sir George Reid as president of the Royal Scottish Academy, and in the following year was knighted. The University of Glasgow conferred on him the degree of LL.D. in 1906 and Edinburgh likewise in 1913. Of his early works the most noteworthy are 'The Gipsy Fires are Burning, for Daylight is Past and Gone' (1882); 'Midsummer' (Edinburgh Museum); 'Funeral Service in the Scottish Highlands' (Glasgow Gallery); 'Schoolmates' (Ghent Gallery). His best portraits include those of Charles Barrie (Museum of Victoria, Australia); his own mother, Mr. R. Garroway, Major Hotchkiss, Mrs. Fergus and Professor Jack. There are several of his works in the Carnegie Institute, Pittsburgh. Consult Caw, 'Scottish Painting, Past and Present' (Edinburgh 1908).

GUTHRIE, Samuel, American chemist: b. Brimfield, Mass., 1782; d. 1848. He studied at the University of Pennsylvania and served in the medical corps of the army in the War of 1812, in the capacity of examining surgeon. To him is attributed the invention of the first successful percussion powder; the discovery of chloric ether (1831); the invention of a process for the conversion of potato starch into sugar, and also the punch-lock musket.

GUTHRIE, Thomas, Scottish clergyman and philanthropist: b. Brechin, Forfarshire, 12 July 1803; d. Saint Leonards, Sussex, 24 Feb. 1873. He was educated at the University of Edinburgh and was licensed as a preacher in connection with the Church of Scotland in 1825. He was appointed minister of Arbirlot in 1830 and accepted a call to Old Greyfriars, Edinburgh, in 1837, where his eloquent and arrestive preaching and broad sympathies made him popular with all classes. In 1840 he was translated to Saint John's parish in the same city. In 1843 the Disruption took place and Guthrie was active with Chalmers and Candlish in organizing the Free Church, becoming minister of Free Saint John's, Edinburgh. The work with which his name is chiefly identified out of Scotland was the establishment of ragged schools, of which he was the earliest advocate. He was also a pioneer in the total abstinence movement in Scotland. On retiring from the ministry in 1864 he was editor of *The Sunday Magazine* till his death. Among his published works are 'The Gospel in Ezekiel' (1855); 'A Plea for Ragged Schools' (1847); 'The City: its Sins and Sorrows' (1857); 'Autobiography' (1874–75). Consult Smeaton, 'Thomas Guthrie' (1900).

GUTHRIE, Thomas Anstey («F. ANSTEY»), English humorist: b. Kensington, London, 8 Aug. 1856. He was graduated from Cambridge in 1875 and called to the bar in 1880, but never practised and has devoted himself to authorship, his books having been extremely popular both at home and in the United States. He is the author of 'Vice Versa' (1882); 'The Giant's Robe' (1883); 'The Black Poodle' (1884); 'The Tinted Venus' (1885); 'A Fallen Idol' (1886); 'The Pariah' (1889); 'Tourmalin's Time Cheques' (1890); 'Voces Populi' (1890); 'Puppets at Large' (1897); 'Love Among the Lions' (1898); 'The Brass Bottle' (1900); 'A Bayard From Bengal' (1902); 'Salted Almonds' (1906); 'Percy and Others' (1915); 'In Brief Authority' (1915).

GUTHRIE, William B., American educator. He was educated at Lenox College, Hopkinton, Iowa, at Iowa University, Columbia University, the University of Berlin and the School of Law, Paris. He became manager of the Riverside Settlement House, New York, and special lecturer at New York University. He was departmental editor of *Charities and the Commons.* For many years he has been connected with the College of the City of New York, being at present associate professor of political science. He is a member of the American Political Science Association, the Society of International Law, etc. He has written 'Housing Problem in German Cities'; 'History of Socialism before the French Revolution'; 'Brief History of the American People' and contributions to encyclopedias and journals.

GUTHRIE, William Norman, American clergyman, educator and author: b. Dundee, Scotland, 4 May 1868. He was graduated at the University of the South 1889, (A.M., 1891). He became assistant professor of modern languages in the University of the South 1889–90; and professor of modern languages, Kenyon College, 1892–93; was ordained to the Protestant Episcopal ministry 1893; missionary in charge, Christ Church, Kennedy Heights, 1893–94; assistant rector, Church of the Advent, Cincinnati, 1894–96 and lecturer on comparative literature, University of Cincinnati, 1898–1900. He was rector of the church of Resurrection, Fern Bank, Ohio, 1899–1903; Christ Church, Alameda, Cal., 1903–08 and professor of general literature and director University Extension Department, University of the South, 1908–10; rector Saint Mark's in the Bouwerie, New York, since 1910. Director Cincinnati Conferences, Art and Literature 1900–03; professorial lecturer in general literature, University of Chicago, 1909. Author 'Love Conquereth' (1890); 'Modern Poet Prophets'; 'Essays Critical and Interpretative' (1897–99); 'To Kindle the Yule Log' (1899); 'Songs of American Destiny' (1900); 'The Old Hemlock' (1901); 'The Christ of the Ages in Words of Holy Writ' (1903); 'Orpheus To-day, Saint Francis of the Trees and Other Verse' (1907); 'The Vital Study of Literature' (1911); 'Beyond Disillusion', a dramatic study of modern marriage; 'Uncle Sam and Old World Conquerors', a patriotic satire (1916); 'The Gospel of Osiris' (1916); 'Leaves of the Greater Bible' (1917). He was editor of the *Forensic Quarterly* 1909–10; *Dramatic Quarterly* 1910–11, etc.

GUTHRIE, Okla., once capital of the territory of Oklahoma and the county-seat of Logan County, on the Cottonwood River and on the Atchison, Topeka and Santa Fe, the Chicago, Rock Island and Pacific, the Oklahoma Eastern, the Missouri, Kansas and Texas, and Fort Smith and Western Denver, Enid and Gulf and the Saint Louis, El Reno and Southern railways. Guthrie has a very large trade, and is especially noted as a wholesale distributing centre. It has planing, cotton, flour and cottonseed oil mills, furniture and carriage factories, foundry and machine shops, broom works, plow factory, creamery, railroad repair shops, novelty works, bookbindery, etc. Guthrie's chief buildings are the capitol, Federal court and post office building, the city hall, the Scottish Rite temple, Carnegie library and the Federal prison. The Carnegie library (costing $25,000) is a noteworthy institution. The city possesses an excellent public school system, including a high school and a $50,000 county high school. The Methodist University is centrally located here; on a height overlooking the city on the west is Saint Joseph's Academy and many private schools add to the city's educational facilities. Guthrie is on a sound financial basis. Out of 25 representative cities scattered throughout the United States, including the principal cities of Oklahoma, there are but four where the per capita cost of city government, not taking into account outlays for interest and public improvements, are less than that of Guthrie. The city's operating expenses under the present form of government have been reduced 50 per cent in the last four years. The city is under the commission form of government, the board consisting of three commissions: mayor and commissioner of accounts and finance, commissioner of public utilities, commissioner of public safety. The chief of police and all other city officers are chosen by the people. The city has electric lighting and owns and operates its own waterworks, has 21 miles of paved streets, large natural gas plant and a new municipal bath house. Guthrie dates its existence from the opening of the Territory in 1889, and it was made the capital city one year later, in 1890. The city has had a rapid development. Its rival, Oklahoma City, about 30 miles south, is the State capital. Pop. 12,000.

GUTIÉRREZ, goo-tyar-ras, **Santos,** Colombian President: b. Cocui, Boyacá, 1820; d. 1872. He was educated for the legal profession and began practising in 1839. After holding a number of minor offices, he supported the Liberals in the Revolution of 1859–63, and by his effective generalship contributed largely to the success of his party. He became successively member of the national Congress, governor of Boyacá, national senator, Minister of Foreign Relations and finally succeeded to the Presidency in 1868. He retired from political activity in 1870.

GUTIERREZ DE LARA, Bernardo, Mexican patriot: b. Quanajuato, 1778; d. San Antonio, Bejar, 15 March 1814. When Hidalgo and Allende, after the defeat of Calderon in 1811, were on their way to the United States to reorganize their forces, Gutierrez met them early in March and offered his services. He was appointed colonel and sent to Washington, where he arrived in August. His mission was not recognized and he went to New Orleans, where he gathered a force of 450 men. He marched to Texas in February 1812, captured the town of Nacogdoches and the presidio of Trinidad, and a few days afterward the Bay of Espiritu Santo, where he found important stores of ammunition and provisions. The Spanish governor of New Leon and Texas besieged Gutierrez in Trinidad, but after four months the latter made a sally and broke through the enemy's lines. In August of the same year he defeated the Royalists at Rossillo, capturing all their artillery, and shortly afterward gained other victories, making him the master of New Leon and Texas. But Alvarez de Toledo, who had been appointed commissioner to Washington, entered there into secret transactions with the Spanish government, and also instigated Gutierrez's forces to demand the execution of the governor of Leon and Texas. When their commander, in a moment of weakness, submitted, Alvarez appeared in his camp with accusations, and brought about a mutiny, which deposed Gutierrez and put Alvarez in his stead. Gutierrez was patriot enough not to abandon the army in the hour of need, as Arredondo was approaching with large forces to subdue the patriots. The revolutionary army was defeated and Gutierrez perished in the battle.

GUTNIC, goot'nik, or **GUTNISH,** a dialect spoken by the inhabitants of the island of Gotland in the Baltic Sea. It belongs to the East Norse group of languages, and is known from the runes of the 7th to the 16th centuries. It is also preserved in several 14th century manuscripts.

GUTSMUTHS, goots'moots, **Johann Kristoph Friedrich,** German educator: b. Quedlinburg, 9 Aug. 1759; d. Schnepfenthal, 21 May 1839. After receiving training at the University of Halle, he subsequently taught geography and gymnastics at Salzmann's school at Schnepfenthal where he remained from 1785 until his death. Gutsmuths was a pioneer in the pedagogy of gymnastics, on which subject he wrote 'Gymnastik für die Jugend' (1793); 'Spiele zur Uebung und Erholung des Körpers und Geistes für die Jugend' (1796), which was translated into all European tongues. He contributed valuable studies to the method of teaching geography also, embodied in his book 'Handbuch der Geographie' (1810). From 1800–20, he edited a library of pedagogy, to which he contributed a number of volumes, under the title 'Bibliothek für Pädagogik, Schulwesen, und die gesammte pädogogische Literatur Deutschlands.'

GUTTA, güt'ta, in architecture, a decoration used to ornament the lower surface of the mutules of the Doric cornice, or the triglyphs of a Doric frieze. They are either cylindrical in shape, or like the frustum of a cone. They are evidently a survival of the wooden nails which were used in the construction of timber Doric edifices, but were also used in early times in stone construction as ornaments.

GUTTA PERCHA, pėr'ka, a substance which has been known generally and used in Western countries only since about 1845, though travelers and residents in the East were acquainted with it long before, and had seen various articles made of it, but without knowing the nature of the material. The commercial article is made from the inspissated milky juice of several large trees belonging to the order *Sapotaceæ,* the principal being *Isonandra gutta,* and is obtained by felling the large and old trees, cutting off rings of bark at intervals along the stem, collecting the juice which issues, and concentrating by evaporation, if necessary. The result of this terribly wasteful process is, that the gutta percha tree has been exterminated from various districts in which it was formerly abundant. The tree is found in the Malayan Peninsula, and in some of the neighboring islands, in great numbers and of very large size; but if these trees be also cut down, instead of the juice being tapped by incisions (a method which has now come into use), gutta percha will become one of the rarest of substances.

The crude substance is gray or reddish, and is mixed with fragments of bark, leaves and other impurities, from which it is separated by washing with cold and then with warm water. This softens the gutta percha, and the impurities can be easily picked out. When pure it has a brown color; at the ordinary temperature it is hard and tough, and in not too thick pieces is flexible like leather. It is elastic only to a very slight extent, and cannot be beaten out. It has little or no adhesion for other bodies, but its own cohesiveness is remarkable, a thin strip of it bearing a very considerable weight. When warmed it gradually softens and then can be drawn into fine fibres, rolled into sheets or molded. For the latter purpose it is admirably adapted, as when warm and soft it takes the finest impressions, which it retains after it has become cold and hard. When heated to a sufficiently high temperature in the air it catches fire, and burns with a bright flame; heated in close vessels it gives off oily hydrocarbons and an acid liquor, so that gutta percha seems to consist mainly of carbon and hydrogen, with some oxygen, while nitrogen is absent, or present only in very minute quantities. Attempts have been made to resolve gutta percha into proximate constituents, and accordingly three substances extracted from it have been described. These are named respectively gutta, which is the chief constituent, and when pure is white and opaque; alban, a white oxygenated crystalline substance; and fluavil, also oxygenated, and of a yellow color. These two are said to be formed from the first by oxidation, but there is a considerable diversity of opinion on the nature of these bodies. Ordinary gutta percha is insoluble in water, partially in alcohol and ether, readily and completely in chloroform, turpentine, benzol, bisulphide of carbon and naphtha. It is also dissolved to a slight extent by oils. It is not attacked by solutions of alkalis, nor by hydrofluoric acid; but it is acted on by sulphuric, nitric and hydrochloric acids — being darkened in color, oxidized, rendered brittle or altogether disintegrated — and by chlorine, which transforms it into a white substance like ivory. It is also affected by the oxygen of the air, especially in light, becoming brittle, resinous and acid; it combines with sulphur and, like caoutchouc, can be vulcanized, being then often popularly miscalled hard rubber. It may also be mixed with caoutchouc in a soft, elastic composition. Gutta percha is employed for a great variety of purposes, especially for insulating electric wires, being invaluable for submarine telegraph cables because it is not affected by water, is very pliant and forms a uniform and close-fitting coating to the wires. It is much prized for making certain kinds of surgical instruments, and in sheets for surgical dressing, and is used for making water-pipes and tubes of various kinds, hose, buttons, dental plates, golf ball covers, overshoes, buckets, picture-frames and many other articles in general use. The United States importation and consumption was about 1,600 tons in 1916, and the quantity tends to increase. Consult Pearson, 'Crude Rubber and Compound Ingredients' (1909); McIntosh, 'India Rubber and Gutta Percha' (1910).

GUTTENBERG, güt'ĕn-bĕrg, N. J., a town in Hudson County, on the Hudson River, 10 miles northeast of Jersey City. The chief industries are stone quarrying, lard refining and the manufacture of embroidery and pearl buttons. Pop. 5,700.

GUTTER, *in architecture*, a horizontal channel constructed to conduct water from buildings or roads. On Greek buildings, the gutters were carved in the cornice stones, and the contents discharged to the ground through gargoyles, carved at intervals in the cornice. The Greek gutter prevailed in Roman buildings, but there were also gutters of cemented tiles. In mediæval architecture, gutters are found mainly on church structures,— the channel being constructed along the top of the wall, and the water being emptied by means of gargoyles on the buttresses. Lead pipes conducting the water to the ground began to appear in England about the 14th century. They were square and ornamental. In modern buildings, gutters are made of some kind of metal, and in large stone structures the stone gutters are metal-lined.

GUTZKOW, güts'kō, **Karl**, German dramatist and novelist: b. Berlin, 17 March 1811; d. Sachsenhausen, near Frankfort, 16 Dec. 1878. He is best known in German literature by reason of his connection with the group of writers known as "Jung-Deutschland." He was born of an extremely poor family, not proletarian, but of the lowest and most menial branch of state employees. His father had become pietistic and puritanical in his outlook and demands, and Gutzkow's later agnosticism is probably a reaction against the excessive religiosity of his early surroundings. In 1829 he matriculated at the University of Berlin, under the faculty of philosophy. News of the 1830 July Revolution at Paris moved him deeply. The general atmosphere of radicalism pervading Europe at that time, and perhaps more specifically, a reading of the 'Life of Jesus,' by D. F. Strauss (q.v.), influenced Gutzkow in the composition of his first novel, 'Wally die Zweiflerin' (1835), which exalts the agnosticism and emancipated views of the heroine, Wally. There are incorporated in this book many ideas that Gutzkow had recently absorbed from French writers, notably Saint-Simon (q.v.), particularly the latter's theory of the emancipation of the flesh. For a decade (1839–49), Gutzkow turned his attention to the German drama, which had declined rather sadly, in the hands of commercial exploiters and romantic book-drama traditions, to a very subordinate position; while only one of his dramatic works has permanent value (the tragedy 'Uriel Acosta'), Gutzkow really made the German drama once more a dignified and living institution, dealing with subjects of interest to the people and treating them with dramaturgic skill. 'Uriel Acosta' (1846) is still one of the most popular German plays. Gutzkow had treated the same theme in a short story, 'Der Sadducäer von Amsterdam' (1833). The hero, a young Portuguese Jew living in Holland, is excommunicated by the synagogue for having written a book of heresy. His love of the truth prevents him, in spite of his strong affection for his friends and brethren, from recanting, and he commits suicide. Unlike 'Uriel Acosta,' the other good plays of Gutzkow are all in prose.

In turning his attention to the novel, Gutzkow was actuated by the desire to produce works that were modern not only in theme but also in treatment, and characterized by an acceptance of the latest achievements in philosophy and social psychology. He sets up the following three principles as a guide for the novelist: (1) No longer is the novel to give a merely consecutive presentation of the events in the life of an individual hero; there is to be a simultaneous development of numerous persons, groups and classes, so that the total impression will be that of an organic society, and not merely an exaggerated notion of the importance of certain individuals; (2) "Heroes" in the old sense of the word are to be discarded; simple and sublime motives do not move them; they must have complexity and doubt and uncertain interrelations with other persons; (3) the writer must subordinate all the persons and events of his work to a dominant idea that must govern the whole («ideal unity»), and must correlate all the persons and motives with this idea, thus producing a unified and coherent story («real unity»). In the pursuit of these principles, Gutzkow turned out two enormous novels, 'Die Ritter vom Geiste' (1850–51, abridged ed., 1869), and 'Der Zauberer vom Rom' (1858–61, abridged ed., 1872). The former is a study of a revolutionary movement, a sort of ideal organization, which is to assist its members, with the aid of a free press and of a guarantee of work, in the rebirth of Germany after the revolution. The latter is an attack on the growing power of the Catholic Church. Both are confusing in the immensity of their details, and uninviting to the reader, as novels in nine volumes are not to the taste of the present day.

Gutzkow was essentially a journalist, a disseminator of the opinions of others, and the lot of the journalist, with its distracting lack of concentration and unity of purpose, was his to a fatal degree. He fell into a condition of persecutory mania (1861–78), in the course of which he made fruitless attempts to settle down in various parts of Germany, finally committing suicide at Sachsenhausen. His other works are the dramas, 'Richard Savage' (1839); 'Wullenweber' (1848); 'Zopf und Schwert' (1844); 'Das Urbild des Tartuffe' (1844); 'Der Königsleutnant' (1849); the critical writings 'Briefe eines Narren an eine Närrin' (1832); 'Zur Philosophie der Geschichte' (1835); 'Ueber Goethe im Wendepunkte zweier Jahrhunderte' (1855); 'Die Zeitgenossen, ihre Schicksale, ihre Tendenzen, ihre grossen Charaktere' (1836–37).

JACOB WITTMER HARTMANN,
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GÜTZLAFF, gūts'lạf, **Karl Friedrich August**, German · missionary: b. Pyritz, Pomerania, 8 July 1803; d. Hongkong, 9 Aug. 1851. After studying at Halle and at the missionary school at Berlin, he went to Batavia, Java, under the auspices of the Netherlands Missionary Society in 1826. Two years later he went to Singapore independently; and from there to Siam, where he prepared a Siamese translation of the Bible. From 1829–31 he was occupied with the publication of a dictionary of Cochin Chinese. In these labors he was assisted by his wife who died in the last named year. Gützlaff went next to Macao and then to Hongkong, where he continued to preach, and also translated the Bible into Chinese. During the same time he published a magazine and a number of books on practical subjects in Chinese. In 1835 he was appointed joint Chinese secretary to the English commission and rendered important service in the Anglo-Chinese negotiations in 1842. In 1844 he established a school for the training of Chinese missionaries, which was most successful in its work. Gützlaff was untiring and zealous in his missionary as well as in his scholarly labors, and stands out prominently among the early pioneers of Christian workers and interpreters of the Orient. Besides the works already mentioned, he published 'Journal of Three Voyages along the Coast of China in 1831, 1832 and 1833' (London 1834); 'Sketch of Chinese History, Ancient and Modern' (2 vols., London 1834); 'China Opened' (ib. 1838; German ed., Stuttgart 1847); 'Life of Taon-Kwang, Late Emperor of China' (1851, German ed. at Leipzig 1852). He also stimulated much interest in Chinese affairs by his addresses in Europe, and inspired a number of able men to continue his work. The library at Munich contains a complete collection of his writings in Chinese.

GUY, Thomas, English philanthropist: founder of Guy's Hospital, London: b. about 1645; d. 27 Dec. 1724. His principal income arose from the disreputable purchase of seamen's prize tickets in Queen Anne's War, and from his dealings in South Sea stock in 1720. By these speculations, aided by most penurious habits, he amassed a fortune of nearly half a million pounds sterling. It was said of him that he almost starved his bookbinders, and «gave but a few farthings to the poor in his lifetime.» He, however, assisted his poor relations, and was liberal in setting up deserving young men in business. He spent upward of $1,000,000 in building and endowing his hospital in Southwark. He also erected almshouses at Tamworth, furnished three wards of Saint Thomas' Hospital, and benefited Christ's Hospital and various other charities. He was member of Parliament for Tamworth 1695–1707.

GUY OF LUSIGNAN, loo'zē'nyäṅ, king of Jerusalem and Cyprus: b. Poitou; d. Cyprus 1194. He married Sibylla, daughter of Amaury, king of Jerusalem, and after the death of Baldwin V, her son by her first marriage, succeeded to the throne of the kingdom. In 1187 he was defeated by Saladin's forces at Tiberias and taken prisoner, but was soon released. When Sibylla died in 1190, Conrad became king of Jerusalem and Guy re-engaged in the battles against the Moslems and was later appointed king of Cyprus by Richard I (1192).

GUY MANNERING, a novel by Sir Walter Scott. It was the second of his novels, appearing anonymously in 1815, seven months after 'Waverley.' It is said to have been the result of six weeks' work, and by some critics is thought to show the marks of haste. Its time is the middle of the 18th century, its scene chiefly Scotland. There are fewer than two-score characters in 'Guy Mannering,' and the plot is not very complicated. Meg Merrilies, and Dominie Sampson, the uncouth, honest pedant, are the only great creations it contains.

GUY OF WARWICK, a metrical romance belonging to that Anglo-Danish cycle from which the Norman trouvères drew so much material. The earliest existing manuscripts of this romance are in French, though it is supposed to have been written by Walter of Exeter, a Cornish Franciscan. It consists of about 12,000 verses, iambic measure, arranged in rhymed couplets.

GUYAU, gē'yō', **Jean Marie**, French philosopher: b. Laval, 28 Oct. 1854; d. Menton, 31 March 1888. He was the son of Alfred Fouillée (q.v.). He was educated by his uncle, and displayed such remarkable precocity, that at the age of 19 he was crowned by the Academy of Moral Sciences for his 'Memoire sur la morale utilitaire depuis Epicure jusqu'à l'Ecole anglaise.' In the following year he was appointed teacher in philosophy at the Lycée Condorcet, but was forced by ill-health to abandon the undertaking. He spent his remaining years in producing various works on philosophy, among which the most important are a translation under the title 'Manuel d'Epictète' (Paris 1875); 'La Morale d'Epicure et ses rapports avec les doctrines contemporaines' (1878); 'La Morale anglaise contemporaine' (1879); 'Vers d'un philosophe' (1881); 'Esquisse d'une morale sans obligation in sanctions' (1885); 'Les Problèmes d'Esthétique contemporaine' (1884); 'L'Irréligion de l'avenir' (1887); 'L'Art au point du vue sociologique' (1889); 'Education et Hérédité' (1889); 'La Genèse de l'idée du Temps' (1890). He also published several books on education, and contributed to the *Revue des Deux Mondes* and *Revue philosophique*. The philosophy of Guyau is distinguished by its intensely sociological point of view. Art, philosophy, science, religion, beauty, education, ethics — all these derive their value from their social necessity only. Consult Fouillée, 'La Morale, l'Art et la Religion d'après Guyan' (Paris 1889).

GUYON, Jeanne-Marie Bouvier de la Motte, zhän mä-rē boo-vē-ā dė lä mŏt gē-ôṅ, **MADAME,** French mystic: the introducer in France of the system of Quietism: b. Montargis, 13 April 1648; d. Blois, 9 June 1717. At the age of 16 she was married to Jacques Guyon, after whose death in 1676 the tendency to mystic enthusiasm which had characterized her younger years again acquired ascendency. She published numerous works, such as 'Le Cantique des Cantiques interprété selon le Sens Mystique' (1685); 'Poésies Spirituelles' (1685); 'Discours Chrétiens et Spirituels' (1716); etc. At last the archbishop of Paris thought it necessary to take steps against the spread of Madame Guyon's mystical doctrines, and through his influence she was shut up in the convent of the Visitation, but afterward released at the instigation of Madame Maintenon, who herself became for a time a convert to the new doctrines, and allowed Madame Guyon to preach in the seminary of Saint Cyr, where she made a convert and disciple of Fénelon. A commission of ecclesiastics, chief among whom was Bossuet, now sat in judgment, and the doctrines of Madame Guyon were condemned (1695). This led to her being imprisoned for some years, latterly in the Bastille, whence she was liberated in 1702. The rest of her life was spent in retirement and in works of charity. Consult Upham, 'Life, Religious Opinions and Experiences of Madame Guyon' (1870); Guerrier, 'Madame Guyon, sa vie, sa doctrine, son influence' (1881).

GUYOT, gē'ō, **Arnold,** American geographer: b. Boudevilliers, Neuchâtel, Switzerland, 28 Sept. 1807; d. Princeton, N. J., 8 Feb. 1884. He was educated at Chaux-de-Fonds, and then at the Collège de Neuchâtel. In 1825 he went to Germany, and resided in Karlsruhe where he met Louis Agassiz. Thence he moved to Stuttgart, where he studied at the gymnasium, returning to Neuchâtel in 1827. He determined to enter the ministry and started for Berlin to attend lectures at the university. While pursuing his studies he also attended lectures on philosophy and natural science. His leisure was spent in collecting shells and plants and from Humbolt he received an entrée to the Berlin botanical garden. In 1835 he received the degree of Ph.D. from Berlin, and spent the ensuing four years as a tutor in Paris. In 1838 he visited the Swiss glaciers and communicated the results of his six weeks' investigation to the Geological Society of France. He was the first to point out the laminated structure of ice in the glaciers. In 1839 he became the colleague of Agassiz as professor of history and physical geography at the College of Neuchâtel. The suspension of the institution in 1848 caused Guyot to emigrate to America, where he settled in Cambridge. He delivered a course of lectures at the Lowell Institute which were afterward published as 'Earth and Man' (Boston 1853). The Massachusetts board of education retained his services as lecturer on geography and methods of instruction to the normal schools and teachers' institutes. He was occupied with this work until his appointment, in 1854, to the chair of physical geography and geology at Princeton, which he retained until his death. He was also for several years lecturer on physical geography in the State Normal School in Trenton, N. J., and from 1861 to 1866 lecturer in the Princeton Theological Seminary. He also gave courses in the Union Theological Seminary, New York, and at Columbia College. He founded the museum at Princeton, many of the specimens of which are from his own collections. His scientific work in the United States included the perfection of plans for a national system of meteorological observations. Most of these were conducted under the auspices of the Smithsonian Institution. The selection and establishment of numerous meteorological stations in New York and Massachusetts were confided to him. He was a member of many American and foreign scientific societies. He prepared a series of geographies and wall maps in 1866–75, for which he was awarded a medal at Vienna in 1873. He was one of the editors of 'Johnson's New Universal Cyclopædia'; wrote memoirs of Carl Ritter (1860); James H. Coffin (1875) and Louis Agassiz (1883); also 'Treatise on Physical Geography' (1873). Consult memoir by J. A. Dana in 'Biographical Memoirs of the National Academy of Sciences' (Washington 1886).

GUYOT, Yves, ēv, French publicist: b. Dinan, France, 6 Sept. 1848. He began his studies at Rennes, and early interested himself in social and economic problems of international importance. He took part in the revolution of 4 Sept. 1870, which, after the surrender of Sedan, established the third republic. He is an ardent reformer, but not a socialist, a free trader and member of the Cobden Club. In 1885 he was elected to the French Parliament, and from 1889–92 made Minister of Public Works. He was from 1892–1903 editor of the *Siècle,* a Liberal paper of a staid, old-fashioned style. In 1909 he became editor of the *Journal des Economistes,* and of *L'Agence Économique* *et Financière* in 1911. He took a prominent part in the defense of Dreyfus, and waged a successful war for the abolition of the continental sugar bounties. Among his writings may be noted ‘La Tyrannie Socialiste’ (1893); ‘Les Principes de ’89 et le Socialisme’ (1894); ‘L’Economie de l’Effort’ (1896); ‘Le Bilan de l’Eglise’ (1901); and ‘La Question des Sucres’ (1901); ‘La Comédie protectioniste’ (1905); ‘La gestion par l’État et ses Municipalités’ (1913); ‘L’industrie et les industriels’ (1914); ‘La Guerre, ses causes et ses consequences’ (1915).

GUYSBOROUGH, gīz′bŭr′ō, Canada, seaport town and capital of Guysborough County, Nova Scotia, on Chedabucto Bay, 60 miles east-southeast of Pictou. The harbor is large and well equipped. The principal occupations are fishing and lumber, carriage and barrel manufacture. The town dates from 1783. Pop. 1,220.

GUYTON DE MORVEAU, gē′tôṅ′ dĕ môr′vō′. **Louis Bernard**, Baron, French chemist: b. Dijon, 4 Jan. 1737; d. Paris, 2 Jan. 1816. He studied law at the university in his native city, and then became advocate-general in the Parlement there in 1751, holding this office until 1782. His natural inclinations were toward the study of science, and to this he devoted his leisure. After retiring from his legal office, he began to publish those researches in chemistry by which he is best known. In May 1782, there appeared his essay on a system of reformed chemical nomenclature, which was later developed into ‘Methode d’une nomenclature chimique’ (1787). In this work he was assisted by Lavoisier, Berthollet and Fourcroy, and it gained immediate popularity among scientists. He contributed the articles on chemistry to the ‘Encyclopédia methodique’ (1792). In 1791, he was again active in politics, becoming a member of the legislative assembly; a member of the National Convention in 1792, and again in 1795, retiring two years later. He also taught at the Ecole Polytechnique, which he had helped to establish, and in 1798 was provisional director of that institution. From 1800–14, he was master of the mint, where he was active in perfecting the use of the decimal system. The French government elevated him to the peerage in 1811, with the rank of baron. Other publications by him include ‘Discours publiques et éloges’ (1775–82); ‘Traité des moyens de désinfecter l’air’ (1801); and with Maret and Durande, ‘Éléments de chymie théorique et pratique’ (1776–77).

GUZERAT, gŭz-ĕ-rät′. See Gujarat.

GUZMAN, gooth′mạn, **Gásparo de.** See Olivárez, Count.

GUZMAN BLANCO, Antonio. See Blanco, Antonio Guzman.

GUZMAN DE ALFARACHE, dā ạl′fä-rä-chā. The earliest extensive novel of roguery is the Spanish fiction ‘Guzman de Alfarache,’ published in its first instalment in 1599, and, in its second, in 1605. Mateo Aleman, the author, was a government official inspired by the success of an amusing story, ‘Lazarillo de Tormes,’ which had been issued anonymously in 1554. ‘Lazarillo’ had set forth ironically the adventures of a little rascal in the service of several masters, each of whom he tricks and satirizes. Aleman, adopting this device, developed the character of the roguish hero and greatly widened his field of adventure. Like Lazarillo, Guzman is a *pícaro* of illegitimate birth who describes with jaunty humor his progress through the world as innkeeper’s boy, mendicant, scullion, apothecary’s apprentice, mock gentleman, soldier and buffoon to a cardinal. He passes from Spain to Italy, lives among the infamous beggars of Rome, and officiates as master of intrigues for the French ambassador in that city. In the «Second Part» of the novel he wanders to Florence, Siena and Bologna, cheating and being cheated, before returning to Spain, where various escapades lead to his confinement in the galleys. The story concludes with his release, as a reward for having revealed a plot concocted by his fellow convicts. Before the appearance of this «Second Part» a certain Juan Martí of Valencia, writing under the pseudonym Mateo Luxan de Sayavedra, had issued a spurious sequel to Aleman’s novel, carrying Guzman through a similar picaresque Odyssey but choking the narrative with moral digressions. Aleman had moralized, also, and provided romantic relief from his ultra-realistic scenes by inserting serious or sentimental tales in the Italian style; but it was his gift of humorous observation that rendered popular his work. A contemporary affirms that by 1605, 26 editions had appeared. While thousands of copies were circulating in Spain, ‘Guzman de Alfarache’ was translated into French, Italian, German, English, Dutch, and even Latin. No other Spanish fiction save ‘Don Quixote’ has exerted so wide an influence. The English reader may consult the translations of James Mabbe (1622), A. O’Connor (1812), J. H. Brady (1821), and E. Lowdell (1883), as well as discussions of this novel and its kind in F. W. Chandler’s ‘Romances of Roguery’ (1899) and F. De Haan’s ‘Outline of the History of the Novela Picaresca in Spain’ (1903).

Frank W. Chandler.

GUZMÁN EL BUENO. To a dramatist who manifested but mediocre powers in his other works is due the best scenic rendition of the tradition of Guzmán el Bueno. The early chronicles have much to tell us about the unswerving loyalty of this doughty old Spanish warrior, who fought as a free-lance among the Moors and later became an able lieutenant of his liege lord, Sancho IV (1284–95), for whom he held the important fortress of Tarifa, after Sancho had wrested it from the Moors. Of these an army came over from Africa and, abetting the designs of King Sancho’s treacherous brother, Don Juan, laid siege to the stronghold. Summoned by Don Juan to surrender the place, Guzmán refused and persisted in his refusal, despite the threat of Don Juan to slay Guzmán’s son, who was in his power. According to chronicle and legend, the agonized father not only allowed his loved child to be murdered before his eyes, rather than betray his trust, but he even cast his own dagger from the walls to the recreant Don Juan, requesting him to have at least the decency to kill the youth with an honest man’s weapon.

Two noted Spanish men of letters had treated this moving story before Antonio Gil y

Zárate (1796–1861), for Nicolás Fernàndez de Moratín had based upon it his drama, 'Guzmán el Bueno' (1777), which remains relatively true to the chronicle account, and Quintana (1772–1857) had made it the subject of one of the historical essays in his 'Vidas de los Españoles célebres.' The tragedy of the Elder Moratín lacks the spirit which informs the soul-gripping 'Guzmán el Bueno' (c. 1843) of Gil y Zárate, who does not hesitate to modify the historical and legendary data in certain details, which, as changed by him, lend dramatic intensity to the plot and emphasize its great conflict of love and duty and the triumph of this latter force over all other considerations. Even while Gil y Zárate preserves the heroic coloring of the ancient legend, he succeeds in making his personages living creatures, and he invests his noble verse play with all naturalness of character and action.

J. D. M. FORD.

GWALIOR, gwạ'lē-ôr, India, a Mahratta state, forming part of the Central India Agency. It is of irregular form, about 420 miles long from northeast to southwest, and has an area of 25,041 square miles. The main portion forming the Gwalior assistant agency lies between Rajputana and the United Provinces; other portions are contained in the Indor Residency, and the Bhopal, West Malwa, Bhopawar and Guna assistant agencies, between the Central Provinces and Rajputana. The surface is mostly undulating, with a general slope to the north, where it comprises a part of the great plain of the river Jamna. In the south, portions of it are traversed by the Vindhya Mountains. The Chamba partly bounds it on the northwest. Other Gwalior rivers are the Sind, Betwah and Dussam, tributaries to the Jamna with their affluents, having mostly a northern course. South of the mountains the Narbada carries part of the drainage to the west. The soil is generally of high fertility. Opium-poppy is an important staple of culture, and an abundance of corn and oleaginous plants, sugarcane, barley and peas on the dry lands in winter, and cotton and tobacco are raised. The population are mostly Mahrattas, but include also Bhils, Minos and Coolies, numerous Brahmans, a few Rajputs and a peculiar sect of Mohammedans called *Bhoras,* who are supposed to be of Jewish origin. The chief towns are Gwalior (the capital, also called Lashkar), Ujjain and Mandesur. The state, which has a population of over 3,000,000, was founded after the successes obtained by the Mahrattas over the Mogul forces in 1738, by Sindhia, a chief who raised himself from obscurity by his own merits. He died in 1754. In 1781 Madaji Sindhia negotiated a peace between the British and the Mahrattas, and having introduced European discipline and tactics into his army, possessed himself of Delhi, Agra and the person of the Mogul emperor, in whose name he subsequently acted. He was the most powerful member of the Mahratta confederacy. His successor, Dowlat Rao Sindhia, was defeated by Wellington at Assaye, and at Delhi and Laswari by Lord Lake. After his death in 1827 the state became disorganized, and order was only restored after the battles of Maharajpur and Pennair (1843), in which the British troops were victorious. The state was then constituted subsidiary to the British government. At that time the subsequent chief, Ali Jah Jaiaji Rao Sindhia, was a minor. He was loyal during the mutiny of 1857. In 1877 he was made a G.C.B., and in 1878 was invested with the Star of India. At his death in 1886 he was succeeded by his son Madho Rao.

GWINNETT, Button, American patriot, one of the signers of the Declaration of Independence: b. England, about 1732; d. Georgia, 27 May 1777. He emigrated from Bristol to America in 1770, purchased a tract of land on Saint Catharine's Island, Georgia, and devoted himself to agriculture. He became conspicuous in 1775 by his maintenance of the colonial rights, was elected a representative to Congress in February 1776, and re-elected for the following year, and in 1777 became president of the provincial council, the highest station in Georgia. He planned a military expedition against East Florida, which he refused to entrust to his rival, General McIntosh, whose official rank entitled him to command it, and which resulted disastrously. This event, aggravated by other disturbances, led to a duel between him and McIntosh, in which he was mortally wounded. Consult Dwight, 'Lives of the Signers' (1895).

GWYNIAD, gwĭn'ĭ-ăd, a fish of the genus *Coregonus,* or Whitefish (q.v.).

GWYNN, Eleanor, commonly **NELL GWYNN,** English actress: b. Hereford, England, 2 Feb. 1650; d. London, 13 Nov. 1687. She was at first an orange girl and also gained her bread by singing from tavern to tavern. She became the mistress of Hart and Lacy, the actors, before going in her 16th year upon the stage, where she distinguished herself in light comedy. About 1667 she became the mistress of Lord Buckhurst, who surrendered her to the king. She caused much embarrassment to the Duchess of Portsmouth, who deemed herself too refined for such a rival. It is said that in her elevation she showed her gratitude to Dryden, who had patronized her in her poverty; and, unlike the other mistresses, was faithful to her royal lover. King Charles' dying request to his brother, the Duke of York, was, «Let not poor Nelly starve.» From her are sprung the dukes of Saint Albans.

GYGES, jī'jēz, king of Lydia, founder of the third dynasty (Mermnadœ), reigned about 687 to 657 B.C. According to Herodotus, King «Candaules» (q.v.) (the Lydian king, Sadyattes), boasted of his queen's beauty to Gyges and surreptitiously introduced him into her chamber to convince himself. Indignant at the impropriety, the queen sent for Gyges on the following day and gave him the choice of murdering her husband the king and marrying her or of being himself murdered. Not unnaturally Gyges chose the former alternative, and with the aid of his magic ring, which rendered its wearer invisible, he was enabled to enter the king's chamber unseen and to slay him. Plato says that Gyges was originally a shepherd and that he found the enchanted ring on the body of a man discovered inside a brazen horse. Another version of the story runs that Gyges, a court favorite of Candaules, was the son of Dascylus, an exiled noble, and that the king had sent him to escort his royal fiancée from her home in Mysia. Gyges fell in love with the lady on the way to Lydia; she complained to Candaules, who decided to punish Gyges with death. The latter, however, murdered the king the night before his own execution was to take place; he seized the throne and married the queen. He built up a powerful kingdom and engaged in wars of conquest, being finally killed in battle.

In classic myth Gyges was a son of Cœlus and Terra (Heaven and Earth), a hundred-handed giant who made war on the gods, was slain by Hercules and eternally punished in Tartarus. With reference to Gyges, the king of Lydia, consult Geltzer, H., ‘Das Zeitalter des Gyges’ (1875); Herodotus; Radet, M. A., ‘La Lydie et le monde grec au temps de Mermnades’ (Paris 1893); Schubert, R., ‘Geschichte der Könige von Lydien’ (Leipzig 1884).

GYLIPPUS, jĭ-lip'pŭs, Spartan general of the 5th century B.C. His father was Cleandridas, a Spartan who had been exiled on charges of bribery. He was appointed general of the Syracusan forces against the Athenians in 414 B.C., and was successful in accomplishing their defeat in the following year. Commissioned to return with the booty to Sparta he appropriated a vast portion of it for his own use. For this crime he was banished and ended his days in exile. The story is told in Plutarch, ‘Nicias’ (19, 21, 27, 28); in Diodorus (XIII, 7, 8, 28–32) and Thucydides (VII).

GYLLEMBOURG-EHRENSVÄRD, yul'lēb-boor-y'ārĕn-svärd, **Thomasine Christine,** née BUNTZEN, Danish novelist: b. Copenhagen, 1773; d. there, 2 July 1856. In 1790 she married Peter Andreas Heiberg, an author of considerable repute. A son was born to them, Johan Ludvig Heiberg. Obtaining a divorce from her husband in 1800, she married Baron K. F. Ehrensvärd, a political exile, who adopted the family name of Gyllembourg. On his death in 1815 she took up her residence at Kiel where her son had obtained a professorship. She returned with him to Copenhagen and at the age of 53 began her literary career. Her first work, ‘The Polonius Family,’ appeared in the newspaper *Flyvende Post,* of which her son was editor. In this paper were published also ‘The Magic Ring’ (1828) and ‘En Hverdags historie.’ Others of her novels are ‘New Stories’ (1835–36); ‘Near and Far’ (1843); ‘The Cross Ways’ (1844), and ‘Two Generations’ (1845). Her collected works were published in 12 volumes (1849–51). Consult Heiberg, J. L., ‘Peter Andreas Heiberg og Thomasine Gyllembourg’ (Copenhagen 1882).

GYLLENBORG, yul'lĕn-bôr-y', **Karl,** COUNT, Swedish statesman: b. Stockholm, 1679; d. 1746. Entering upon a military career, he saw service in the Polish War and was later attached to the legation at London in the capacity of secretary. Appointed Minister Plenipotentiary in 1715, he became involved in the conspiracy to reinstate the Stuarts and suffered imprisonment for several months. In 1723 he became councillor of state and in 1738 Prime Minister. At his instigation the “Hattparti” or “Hat Party” was established, a political faction which launched the war with Russia, and was thus responsible for the loss of Viborg (1741–43). Gyllenborg was also chancellor of the University of Lund (1728) and of Upsala (1739). His published works include a volume of poems; a comedy, which was the first to be published in the Swedish language; and ‘Letters Relating to a Design to Raise a Rebellion on his Majesty's Dominions, to be supported by a force from Sweden’ (English and French editions 1717).

GYMKHANA, jĭm-kä'na̧, a term of Hindu origin, presumably derived from *Gend-khana,* that is, ball-house, and associated by Anglo-Indian soldiers and civilians with “gym” or gymnasium, whence its introduction into the English language. It is applied to a building or grounds arranged for athletic recreation, and signifies also the open air meetings for athletic and other mixed sporting events, including horse racing, which are the annual features of almost every military cantonment throughout India.

GYMNASIA AND REAL-GYMNASIA are schools in Germany which correspond in general to the grammar school in England and the lycée in France. The term was derived from the Greek “gymnasium,” which was originally applied to an exercising ground in Athens. Here teachers gathered and gave instruction between the hours devoted to physical exercises and sports, and thus the term became associated with and came to mean an institution of learning.

This use of the term did not prevail among the Romans, but was revived during the Renaissance in Italy, and from there passed into the Netherlands and Germany during the 15th century. In 1538 John Sturm founded at Strassburg the school which became the model of the modern German gymnasium. In 1812 a Prussian regulation ordered that all schools which had the right to send their students to the university should bear the name of gymnasia. This practice has now been followed in almost all German states, in Austria and in Russia.

The gymnasium organized by Sturm was the kind of school in which classical studies predominated. This classical character the gymnasium has not lost up to the present time.

To enter the gymnasium a pupil must be nine years of age and must have had three years' previous training in reading, writing and arithmetic. These three years are usually had in what is known as vorschulen or preparatory schools and almost all the gymnasia have such schools connected with them.

The course of study in the gymnasium now covers a period of nine years in which the lowest class is designated the sixth, the next in order being the fifth, fourth, lower third, upper third, lower second, upper second, lower first and upper first.

The subjects of instruction include religion, German and history stories, Latin, Greek, French, history, geography, arithmetic, mathematics, natural history, writing and numbers.

The real-gymnasium is an outgrowth of the classical gymnasium and came in answer to a demand for more modern languages and science. In the real-gymnasium, therefore, English takes the place of Greek and more science is given than in the gymnasium proper.

An institution known as the pro-gymnasium is like the gymnasium, but has only the six lower classes. A student who finishes it then goes to the gymnasium proper for his last three years.

The demand for «practical» or «vocational» instruction has had as little influence on the gymnasium in Germany as it has had on the classical high schools in America, or the grammar schools in England. The demand for such instruction has been met by the real-gymnasium and by the establishment of numerous technical schools.

A student who finishes his gymnasium course passes an examination for graduation and then is admitted to the university. At this time he is about 18 years of age. It is sometimes stated that he is about two years ahead of the American student of the same age. This is, however, a somewhat difficult statement to prove, because the bases of comparison are not the same.

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GYMNASIUM (ancient *gymnasia*). The term «gymnasium» was originally applied by the Greeks to the exercise ground or public training school for men over the age of 18. It consisted of spacious grounds partly planted, but embracing open spaces for a variety of athletic games and contests. The whole space was surrounded by terraces, colonnades and rooms for punching the sack, anointing, bathing and dressing, and was ornamented by statuary of gods and heroes. As the instructors in the gymnasia had to be paid, the places were patronized principally by the well-to-do. The young men engaged vigorously in the athletic games and exercises while the older men were spectators or critics, or perhaps participants in the discussions and lectures that formed an important part of the activities of the place. From the original gymnasium of the Greeks several modern institutions have taken names as well as educational methods. From the suburban gymnasium called the Academy (q.v.) where Plato started his discussion forum and courses of free lectures, came the modern academy; from another gymnasium called the Lyceum, in which Aristotle established his lectures, we have the French lycée and the English and American lyceum. The Germans emphasizing the intellectual side of the Greek institution use the term «gymnasium» to designate their classical secondary school; while the English-speaking peoples with greater propriety have adopted the Greek word to name the modern institution for physical culture and development.

GYMNASTICS, History of. The development of gymnastics began in an early period of Grecian and Roman history. Systematic exercise received the stamp of approbation from the most eminent educators of ancient times and has the endorsement of all teachers to-day. Such exercise has had its periods of decline in popularity, due to the development of professionalism, stimulated by the conferring of extravagant honors and rewards which caused the ranks of the athletes to be filled by a professional class of low extraction, who made their art a trade. But through these periods of decline there have been those who have kept in mind the true value and aim of regularly and systematically conducted exercises; and these advocates have outlived and lived down these evils. So that we find that the scientifically conducted gymnastics have never entirely lost their hold upon educators and those interested in the betterment of mankind.

Modern gymnastics differ considerably from the exercises of the ancients, which at first consisted of athletic feats performed by each individual according to his own notion, and were encouraged among the youth as combining amusement with exercise. They were at length reduced to a system which, in Greece, formed a prominent feature in the state regulations for education. In fact the period for gymnastics was equal to the time spent on art and music combined. Public games were consecrated to the gods and were conducted with the greatest ceremony. The earliest mention we can find of gymnastic sports is in Homer's 'Iliad,' Book II, and again in Book XXIII, when Achilles instituted games in honor of Patroclus and distributed prizes to the victors for boxing and wrestling. Plato tells us that just before the time of Hippocrates gymnastics were made a part of medical study, because they were suited to counteract the effects of indolence and luxurious feeding, and that at length they became a state matter reduced to a system and superintended by state officers. The first public gymnasia were built by the Lacedæmonians. These were imitated at Athens, where, in one called the Academy, Plato instructed his pupils, and in another, the Lyceum, Aristotle taught. These buildings were superintended by a chief officer. The athletics were in charge of a director, and medical officers were in attendance to prescribe the kind and extent of exercise. Baths were attached to the gymnasia, and a hot bath, followed by a cold plunge, was recommended. Plato and Aristotle considered that no republic could be deemed perfect in which gymnasia, as part of the national establishment, were neglected.

The Spartans were the most rigid in exacting for their youth a gymnastic training; even the girls were expected to be good gymnasts. The exercises for pupils in the gymnasia consisted of a sort of tumbling, war-dances, running — for both sexes — leaping, climbing ropes; of jumping or springing from the knees, with weights attached to the body, maintaining the equilibrium while jumping on slippery skins filled with wine; and of wrestling for the throw. Riding, driving, swimming, rowing and swinging supplemented the indoor work.

During the Middle Ages the knightly amusement of the tournament absorbed nearly every other sport except foot-racing and wrestling, so that gymnastics fell into disuse till Basedow (q.v.) in 1776, at his institution in Dessau, united bodily exercises with other instruction. This example was followed by Salzmann at his institute and, from this small commencement, the practice gradually extended. In the latter part of the 17th century gymnastics were extensively introduced into Prussian schools by Guts Muths, who wrote several works on the subject. In 1810 the system was still more widely spread by Jahn, who is regarded as the founder of the present Turnverein (q.v.). Prussia at that time was impatient under Napoleonic rule, and Jahn conceived the idea of bringing together the young men for the practice of gymnastic exercises, and, at the same time, indoctrinating them with patriotic sentiments which might be made available to expel the French from Germany. The Prussian government favored the plan and in 1811 a public gymnastic school, or Turnplatz, was opened at Berlin, and was quickly imitated all over the country. In 1813 the citizens were called to arms against the French and Jahn himself commanded a battalion of Lutzow's volunteers. When, however, there was no longer any reason to dread the French, the government of Prussia, regarding the meeting of patriotic young men as a means of spreading liberal ideas, closed the gymnastic schools and Jahn was imprisoned. In other countries, however, the system introduced by Jahn was eminently successful, especially in England, Switzerland, Portugal and Denmark. It was first introduced into female education under the name of calisthenics when systematic exercises were added to hoop-trundling, skipping-ropes, etc., and to riding, archery and other healthy outdoor exercises practised among young women.

The masculine sports of cricket, football, quoits, boxing, wrestling, leaping, foot-racing, etc., have been for centuries enjoyed by the boys of England in the playgrounds attached to the schools. In 1848 the political condition of Europe enabled the Turnverein to be reorganized and the German emigration to the United States has brought these institutions with it. The first society was formed in New York. The organization, as first established, was confined to the practice of bodily exercises, but soon assumed a higher scope. Libraries were collected, schools established, a newspaper (*Turnzeitung*) founded, and various arrangements were made for the diffusion of useful knowledge and for mental culture as well as physical training. Much credit must be given to Ling for his efforts to develop educational gymnastics. He has many followers, and his publication on ‹Educational and Curative Gymnastics› has much merit. Ling has been severely criticized by English writers for his claims to originality. They go so far as to say that he simply used the works of authors of his time and of an earlier period, and took his *holus-bonus* from Dr. Francis Fuller in the ‹Medicina Gymnastica.› The first edition was published in 1728, and it ran through eight others. It is also claimed that he borrowed in its entirety, without acknowledgment, the work of one John Pough, ‹A Physiological, Theoretic and Practical Treatise on the Utility of the Science of Muscular Exercise for Restoring the Power of the Limbs,› with such materials and German gymnastics as had previously found their way through Denmark and Sweden. Through the exertions of such men as Salzmann, Jahn and others, together with certain English authorities as Fuller, Pough, Croft, Clias, Thomas and John Graham, it was not difficult to establish a system. In fact Salzmann's gymnastics for youth needs only what Pough supplies to give all that Ling calls his system which is only adapted to beginners. The quality of the Ling exercises is stilted and there is little scope for variety. The fact is, the system sticks too closely to automatic movements, which undoubtedly produce precise and studied monotony in drill.

Turning now to the Dio Lewis period, we see that it marks an epoch in the introduction of an American system of physical training formed in a small measure upon the Swedish and largely upon the German system. This system incorporated free-arm exercises, the use of dumb-bells, clubs, rings, wands, together with what was then called the Pangymnastikon, but which was nothing more or less than a pair of flying rings equipped with a pair of detachable stirrups from which swinging, jumping and stretching exercises were performed. Dio Lewis' work took up the matter of the school-desk, criticized the faulty position of the ordinary desk and the poor schoolroom ventilation. In 1861 the Normal Institute for Physical Education was incorporated and located in Boston. Its directors included many of the most distinguished educators of New England, and its departments of anatomy, physiology and hygiene were in charge of able teachers. Dr. Dio Lewis gave the work in gymnastics. The aim of the institute was and is to furnish competent advocates and teachers of physical training.

Next follows the work of Dr. Sargent, with his American system of gymnastics. Dr. Sargent was born in Maine. He was fond of all kinds of outdoor sports and physical exercise, and joined a gymnasium club while attending high school; but as he had to work out of school hours to support his family, he could only attend to his exercising at odd moments as time permitted. On one occasion he broke a piece of apparatus and was expelled from the club. Piqued and aroused, he improvised an apparatus of his own in a barn. Shortly afterward the club gave a display and, after the members had finished, Sargent and a friend came forward and easily surpassed the athletic feats performed by the others. This event is said to have been the direct cause that led Dudley Sargent to become an ardent physical educator. He was graduated from high school in 1867, was invited to become teacher of gymnastics in Bowdoin College in 1869, and entered the college as a freshman in the regular course and conducted the physical work. In an endeavor to arouse the faculty and the public to the necessity for physical training, he was successful to the extent that, in 1871, gymnastics became a part of the regular curriculum and Mr. Sargent, though a student only 22 years of age, was placed at the head of the department, and filled the position with credit. About this time he brought out his system of chest-weights. In 1872 he accepted a position as director of the Yale College gymnasium, and for three years had charge of both Yale and Bowdoin, spending part time in each place. It was while at Yale that he fully developed the «individual apparatus» for which he is so well known. At the solicitation of friends he went to New York and started a gymnasium on Fifth Avenue, which at once sprang into popularity. In 1879 he accepted the appointment of director of the Hemenway Gymnasium and assistant professor of physical training at Harvard University. This promotion of the department of physical training to a rank equal to the scholastic departments of the university was a great stride forward, and stamped the new system with the mark of public approval. To Dr. Sargent is the credit due for the invention of the chest-weight, the intercostal machine, quarter-circles, leg and finger machine, and other appliances to the number of 30 or more. He also elaborated a system of anthropometric measurements which enable an examiner to ascertain at once the physical condition of a student, and which guided a director in prescribing proper exercises for the development of deficient parts. Dr. Sargent believes in special work for individuals, and will not allow a man or woman to go into the gymnasium and take the drills and work with the apparatus indiscriminately. Health, harmony and symmetry are the results aimed at.

About the same time, physical training was taken up by and introduced into the Young Men's Christian Association, whose local gymnasia have done much to give the work a moral tone. We owe a great deal to such men as R. J. Roberts of Boston, whose name has been associated with the advancement of physical education since 1875, and whose dumb-bell drill and book of exercises has long been a standard in the association's work. The organization of the physical work under the auspices of the Young Men's Christian Associations has been practically responsible for the systematization of the American system of gymnastics, and for the establishment of a universal nomenclature of gymnastics. Among those who have done most for physical training along educational lines, may be mentioned Dr. Hartwell of Boston, Dr. Gulick of New York and Dr. Seaver of Yale.

To-day, practically, all private schools have a well-equipped gymnasium under the direction of a man who has had special training in the application of exercise, the theory and practice of gymnastics, and who is, in many cases, a medical graduate. Systematic progressive courses of work are conducted, which aim to develop and strengthen, to give co-ordination and grace, and to make the individual self-reliant and resourceful. The equipment required to obtain this result is necessarily extensive, consisting of a gymnasium, say 50 × 100 feet, with clear floor space, high-vaulted roof, a fine system of ventilation, and with every variety of apparatus which the ingenuity of the specialists, and the energy and resourcefulness of the manufacturers, can provide. The equipment consists of light apparatus — dumb-bells, Indian clubs, bar-bells, wands; heavy apparatus — German horse, parallel bars (suspended and floor), horizontal bars (high and low), buck, flying rings, traveling rings, horizontal and vertical ladder, climbing ropes, rope ladders, spring-boards, beat-boards, floor-mats, wrestling and tumbling mats, Swedish stahl bars, booms, serpentine ladder and balance-beams; as well as special apparatus — chest-weights, intercostals, quarter-circle, chest-expander, traveling parallels, wrist-machine, long inclined plane, sculling-machine, paddling-machine, leg-machine, neck-machine, bicycle-trainer and so on through an almost endless variety. No plant is complete without its swimming-tank, varying in size from 15 × 45 up; its shower-baths, needle-baths, tub-baths; and some have steam-rooms and massage-tables. An indoor running track is an almost indispensable adjunct to all well-equipped gymnasia; and there should also be the equipment for indoor athletics during the winter months. Provision for indoor games is also essential — basket-ball, baseball and ring-hockey. Each school has adjacent athletic grounds with tennis-courts, quarter-mile track, football and baseball fields and golf course. See PHYSICAL TRAINING.

The college physical departments surpass those of the preparatory schools only in size and extent of equipment. Harvard University probably excels all others in point of variety of equipment for special work. The summer work in the public parks and school playgrounds must also be noted. These out-of-door gymnasia are equipped with extensive apparatus for all outdoor work. Preparatory school work in gymnastics is, by general consent, made to consist of a system of corrective, body-building exercises, made up of free-arm work and light calisthenics in the lower grades, followed by heavier calisthenics, dumb-bells, clubs and wands, light apparatus, intermediate and advanced apparatus, boxing, wrestling and fencing, interspersed with periods for recreative games, competitions and contests of skill and strength.

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GYMNOCLADUS, genus of trees of the natural order *Leguminosæ,* sub-order *Cæsalpinieæ. G. Canadensis* is found in Canada and over a great part of the United States, attaining a height of from 50 to 60 feet, with branches remarkable for upright direction, and an exceedingly rough bark which comes off in slips. The leaves of the trees when young are very large, three feet long and bipinnate. The tree is called Chicot in Canada, and sometimes Stump Tree, from its dead appearance in winter, and the absence of buds. It is also called the Kentucky Coffee Tree, because the seeds were formerly roasted and ground as coffee in Kentucky. The wood is used by cabinet-makers and carpenters.

GYMNODONTS, a family of fishes in which the jaws are covered with a substance resembling ivory, arranged in small plates representing united teeth. The family includes the sunfishes, globefishes, porcupine fishes, etc.

GYMNOPHIONA, jĭm-nō-fī'ō-nạ. See Cæcilian.

GYMNOSOPHISTS (Gk. *γυμνοσοφιστής,* from *γυμνός, gymnos,* naked, and *σοφιστής, sophistes,* sage), the name applied by the Greeks to those ascetic Hindu philosophers who sought to free the mind from all obstacles to philosophic contemplation by abstention from food and clothing. They were also called Hylobioi by the Greeks on account of their life in the forest. Their Sanskrit appellation, Vanaprasthas has the same significance. They are mentioned by Plato, by Diogenes Laertius and by Strabo, who divides them into Brahmans and Sarmans, of which only the first, he says, observed the distinctions of caste with all strictness. The gymnosophists in ancient India filled the place now occupied by yogis and fakirs.

GYMNOSPERM, jĭm'nō-spėrm, a plant with a naked seed. Among the gymnosperms are the cycads, gingkos, conifers and *Gnetaceæ.* The last group has numerous representatives, among them an extraordinary tree or plant of West Africa (*Welwitschia mirabilis*), the stem of which, looking like a huge wood-fungus, may, when mature, be a little over a foot high but several feet across. It bears but two leaves, the cotyledons, which sometimes grow to be five or six feet long and two or three feet wide, ultimately splitting into strips. The plant is said to live over 100 years.

GYMNOTUS, jĭm-nō'tŭs. See Electric Fishes.

GYMPIE, gĭm'pị, Australia, town of March County, Queensland, 107 miles north of Brisbane, with which it is connected by rail. There are mines in the neighborhood for gold, silver, copper, antimony and bismuth. The coal mines are as yet not developed. Pop. 12,500.

GYNÆCOLOGY, in medicine and surgery, the science which treats of the physical organization of women and of the diseases peculiar to them.

GYNÆCUM, jĭn'ē-sē'ŭm', apartments in a Greek house set aside for the use of the women. «Gynæcontis» was the word used by Procopius to designate the space reserved for women in the Eastern Church.

GYOMA, dyō'mạ, Hungary, town in the county of Békés, on the Körös River, 115 miles east-southeast of Budapest, with which it is connected by rail. It is the centre of an agricultural district, and markets grain, fruit, cattle and sheep. Wine, bricks and cereals are the principal manufactures. Pop. 17,700.

GYÖNGYOS, dyėn'dyėsh, Hungary, town in the county of Heves on the river of Gyöngyös, 60 miles northeast of Budapest. The principal buildings are the gymnasium, the Franciscan monastery, and the hospital, erected under the auspices of the Sisters of Mercy. There is extensive trade in grain and cattle, and there are also important manufactures of bricks, wine and copper goods. The mineral springs in the neighborhood are of great medicinal value. Pop. 18,500.

GYOR, dyėr, or **RAAB,** a town in Hungary. See Raab.

GYP, pseudonym of Sibylle Gabrielle Marie Antoinette de Riquetti de Mirabeau, Comtesse de Martel de Janville. See Martel de Janville.

GYPSIES, jĭp'sĭz (from Egyptians, the name by which they were known in the English statutes), a race of wandering tribes scattered over all the civilized countries of the world, but more especially over western Asia, Europe and northern Africa. They are called by the French Bohémiens, from the belief that they were Hussites driven from their country. In Switzerland, the Netherlands and the Black Forest they go under the names of Heiden (Pagans); in North Germany, Denmark and Sweden they are called Tater (Tartars). The name they most frequently pass under in Germany is Zigeuner, which is not unlike the Italian Zingaro or Zingano, the Spanish Zingaro or Gitano, the Hungarian Cigany, the Turkish Tschinganeh. They call themselves Rom, whence Romani, or Romany, the name of their language. The number of gipsies in Europe is roughly set at perhaps 750,000. Of this number about 200,000 are in Rumania; 95,000 in Austria-Hungary; 120,000 in European Turkey; 40,000 in Spain; 40,000 spread over Germany, France and Italy; 18,000 in Great Britain; and the remainder scattered over other countries. The main body of their language is the same throughout Europe, and has a close affinity with the dialects of Hindustan, though it is mixed with a great number of words and expressions borrowed from the races among whom they have sojourned. The gypsies are distinct from the people among whom they dwell, especially in their bodily appearance as a race and in their language. They are slight and agile in frame, though sometimes tall of stature. Their skin is tawny, or olive-colored, their eyes large, dark and brilliant. They have long hair, raven-black and sometimes ringletted. The mouth of the gypsy is small and finely shaped, and the teeth of pearly whiteness. Scientific men have come to the conclusion that these wanderers are neither of European nor of African origin, but are a remnant of some obscure Indian tribe. This ethnological conclusion is borne out by the fact that their language is undoubtedly derived from the Sanskrit, although intermingled with Oriental terms and inflections appear words of Greek, Slavic, Rumanian, Magyar, German, French and English origin.

Organized gypsy bands first appeared in

Europe at the beginning of the 15th century, and in Italy their number in 1422 was computed at 14,000. Five years later they made their first appearance in Paris, saying that they were Christians of Lower Egypt, driven to take refuge in Europe from the Saracens, and had recently left Bohemia. They professed to be performing a penance imposed upon them by Pope Martin V, who, after hearing their confessions of sins committed during their travels, had ordered them to wander over the earth for seven years without taking rest on beds. They were permitted to settle outside the city of Paris; but when they began to practise palmistry and fortune-telling the archbishop had them driven away, and excommunicated the vast number of citizens who had consulted them. Other bands succeeded the 120 gypsies who first made their appearance in Paris; these latter had crossed the Channel for England. They were great thieves and in every European country they visited were regarded with disfavor. In vain laws were passed against them. Francis I of France ordered them to leave the country on pain of being sent to the galleys without trial. The States-General of Orleans condemned them to perpetual banishment. In the middle of the 15th century Pope Pius II cites them as thieves from the Caucasus. In 1492 Spain exiled them and renewed the decree 100 years later. Elizabeth of England followed Henry VIII in uttering a proclamation against them. In Scotland they were sheltered and protected, and John Faw, Lord and Earl of Little Egypt, was empowered by royal writ to exercise authority over his gypsy subjects. Germany tried to eliminate them, and Maria Theresa, in 1768, undertook to settle them as peasants on the land. This attempt was not successful, but Joseph II by severe measures induced many of them to settle, practise trades and have their children educated. They are less a vagrant class than formerly. This is due largely to the stricter policing of the rural districts, and the increase of intelligence among the peasantry, and among the gypsies themselves. See Gypsy Language, Gypsy Religion and Folklore.

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GYPSOPHILA, jĭp-sŏ-fi-la (Baby's Breath). A genus of European and Asiatic annual and perennial herbs of the family *Alsinaceæ*. They are highly valued and widely planted for their small flowers which, being upon branched stems, give a pleasing effect to bouquets and a mist-like grace to flower-borders. They are of simplest culture upon somewhat dry soils, especially among rocks and in sunny situations. The perennial species are hardy. Six or more species and a few varieties are cultivated in American gardens and greenhouses.

GYPSUM (also known as **GYP**), a native hydrated sulphate of calcium, having the formula $CaSO_4 + 2H_2O$; the water of crystallization being the only thing that differentiates it, chemically, from the orthorhombic mineral anhydrite. Gypsum is usually colorless or white. It crystallizes in the monoclinic system, contact twins and penetration twins being very common; and it also occurs in massive forms. The pure crystals have a hardness of from 1.5 to 2.0, and a specific gravity of about 2.32. Gypsum is an exceedingly abundant substance, and is met with in many parts of the earth, and in a variety of forms. When found in the form of clear, transparent crystals, it is known as selenite; when the mineral is finely fibrous, and the fibres are parallel to one another so as to form a mass with a pearly opalescence, the mineral is called satin spar; when it occurs in uniform, fine-grained, translucent masses, it is known as alabaster; and when it occurs in large beds of massive rock, often mixed with clay, calcium carbonate and other impurities, it constitutes the earthy gypsum, or rock gypsum, of commerce. The mineral is often found associated with salt (q.v.) and is believed to have been formed in the same manner by evaporation of lakes in arid regions. Extensive beds of the mineral are known in western United States in the so-called red beds (q.v.) of Permian and Triassic (qq.v.) Age. It also occurs in the salina (q.v.) beds of New York. Gypsum is soluble in from 400 to 500 parts of water at ordinary temperatures, but it dissolves more freely in hydrochloric acid. When heated, it loses part of its water of crystallization, though it retains the power of recombining with water to form a hard, non-crystalline mass, if the temperature to which it is exposed does not exceed 500° F. It is this property of recombining with water which gives to dehydrated gypsum much of its industrial value. (See Plaster of Paris). When heated with charcoal, gypsum is converted into calcium sulphide, which dissolves readily in dilute acids, with evolution of sulphuretted hydrogen gas. In this way the sparingly soluble sulphate of calcium may be converted into the soluble chloride or nitrate of calcium. Gypsum, when pulverized, is used as a fertilizer, its efficiency in this respect being apparently due in large measure to the fact that it facilitates the decomposition of rocks containing alkaline silicates. The production of gypsum in the United States in 1914 was 2,476,465 short tons, valued at $6,895,989. New York, Iowa, Michigan, Ohio, Texas and Oklahoma were the principal producing States, ranking in the order given. The United States ranks second in the world's production of gypsum, France being first, and Canada third. See Mineral Production in the United States.

GYPSY. See GYPSIES.

GYPSY LANGUAGE, a tongue spoken by a wandering race scattered over Europe, Siberia and most of western Asia, Egypt, northern Africa, most of the countries of the American continent and parts of Australia, India and China. It is not known definitely when the gypsies began to flood into Europe; but it was probably at a date earlier than history has recorded, since the many modifications of their tongue, customs and folklore would seem to indicate this. They were early known as Aztigan, from which term is derived their German name *Sigeuner* (Italian *Zingari*, Spanish *Gitano*); but the meaning of the term is unknown. It seems not to have been used by the gypsies themselves. Some writers contend that the gypsies, under the name Komodromoi, were known to the West as early as the 6th century, while others maintain that they did not appear in Europe and western Asia until the 14th century. The derivation of the name Aztigan has been the subject of much discussion, with little to support the various theories advanced. Some have contended that it is of the same origin as the Mexican word Aztec, that is, that it is from the Nahuat language, and that the gypsy belongs to the great Nahuat family. This derivation is based on the purely accidental resemblance of «Aztec» and Aztigan. Other writers have derived the word from the Persian «chang,» a harp, or stringed instrument similar to the zither, or from the Persian «zang,» meaning black. Still others have seen in Aztigan the Athinganoi, the Melki-Zedekite sect of Asia Minor. Numerous other derivations of the name Aztigan have been advanced, all more or less fanciful and unsupported by satisfactory authority. The gypsies call themselves Rom (feminine Romini) in Europe; but it is in no way certain that this is the name they bore when they first came out of Asia. In fact it is almost certain it was not; for they appear to have been early known as «Ciam» in Italy and the adjacent islands. Their first historical movement seems to have been out of Hungary into western and southern Europe. It is not at all certain that at this early period they were as nomadic as they soon afterward became. At any rate the treatment they received in Europe tended to make them wanderers, for they seem to have been wanted nowhere. They were murdered wholesale, enslaved, legislated against, treated as heathen and outcasts, denied the rights of the Christian Church, and driven from one country to another, exile being forced upon them under pain of death. From the British Isles to Russia; from Germany to Italy they were ever in fear of being literally crucified, hanged or burned. This naturally confirmed them, as a race, in their wanderings and made them tenacious of their language, customs, folklore and religious beliefs and superstitions. Christianity, which gave them neither sympathy nor tolerance, naturally obtained little or no hold upon them. But while they thus retained their racial and tribal life, they naturally gathered to themselves many of the customs and considerable of the vocabulary of the countries through which they passed; so that it is often difficult to tell whether many of the words in use in the gypsy language to-day are of European origin or have been handed down from their ancient tongue. This is all the more difficult since the gypsy language, which has been the subject of much discussion and investigation, is now generally admitted to be of Indo-European origin and to be a sister tongue of the Germanic, the Slave, the Celtic and the Greek and Roman tongues. Men like Pott and Miklosich, who made an exhaustive and scientific study of the gypsy language, have come to the conclusion, based upon incontestable evidence, that it must have been, at one time, a more or less distinct tongue spoken by an extensive homogeneous race; and that it has ever exhibited strong independent family characteristics such as could only have been developed by a comparatively pure race. But more recent studies have shown, by the comparison of the gypsy language as now spoken in various parts of Europe and Asia, that it has undergone very fundamental changes in the course of the nomadic life of the race. In the meantime the languages of India have passed through many changes, as have also the Indo-European tongues in Europe. The task of determining the origin of the gypsy language is, therefore, so formidable that it appears, with our present knowledge of the subject, impossible. But the studies already undertaken have proved, for a certainty, its Indian origin. This does not necessarily mean that the gypsies were originally from India; but it does mean that they speak a tongue similar to the Sanskrit, from whatever part of the earth came the races who first spoke it, whether from India, central or western Asia or some other part of the continent.

It is probable that much light will yet be shed on the obscure wanderings of the gypsies through a more detailed study of their language and a comparison of its many dialects and the words it has borrowed from other tongues during these wanderings. These dialects and additions to the language should help to fix the date of the gypsies in various countries; for it is now known that the gypsy tongue has carried many Greek, Latin, Hungarian and Germanic words almost unchanged for long periods of time. Persian and Rumanian words primitive in form also exist in the gypsy speech; and it is probable that further investigation and comparative study will show that gypsy words have been gathered from still other more primitive forms of speech. The gypsy language has, therefore, since the middle of the 19th century, when students of languages first began to pay attention to it, become of very considerable importance in the comparative study of the languages of Europe and southern and western Asia.

Romany, as the gypsy language is called, consists of 14 distinct dialects in Europe alone, which show among themselves as much variation as exists in Spanish and Portuguese or Italian, for example. This means that generally a gypsy who speaks one dialect cannot understand a gypsy who speaks another dialect. Of all these dialects, the freest from foreign influence appears to be those of Hungary, Turkey and the Balkan states. As the gypsies moved westward their language gathered more and more foreign words on the way. Thus the dialects of Spain, France, the British Isles and America have gathered more foreign additions and lost more of the grammatical forms of the earlier tongue and have thus become noticeably corrupted. All these dialects, however corrupted they may be, exhibit Romany as a tongue rich in both vowel sounds and consonants and still possessed of inflections. The nouns have eight cases. There is a regular masculine ending for the article which is nearly always "o." The pronouns are also declined and have the same number of cases as the nouns; and the verbs are conjugated with many and complex forms which make the acquirement of the language difficult. This difficulty is increased owing to the fact that there are many irregular verb and other forms in Romany. The wanderings of the gypsies have also affected the structure, inflections and other forms of their language so that a very considerable difference in grammatical structure exists between the dialects of the British Isles and those of eastern and southern Europe and western Asia, for example. In the latter countries the older grammatical forms still persist while in England they have largely broken down. This makes the study of Romany still more difficult and calls for as much comparative investigation as does the comparative philology of the Romance tongues. This work is being done by a considerable body of enthusiastic students, the works of the more important of which are given in the following reference list.

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GYPSY MOTH (*Porthetria dispar L.*), a destructive insect pest in Europe, introduced into the United States in 1869 by a naturalist who was carrying on experimental work with insects. Later in the season some of the caterpillars escaped and the species established itself. The female moth deposits a cluster containing 400 eggs or more, which she covers with buff-colored hair. Most of the egg clusters are laid during the month of July and hatch about the time the leaves begin to appear the following spring. They are deposited on the underside of branches of trees, on tree trunks, under loose bark, or in cavities in the trunks or branches, and are sometimes placed on stones or rubbish and in a variety of situations where they are concealed from view. As the female moth does not fly, egg-clusters are seldom found far from the food-plant upon which the caterpillars developed. The newly-hatched larvæ feed on the opening leaves, making small perforations. They grow rapidly and become full-fed early in July. During this period they molt five or six times, and as they increase in size a larger proportion of the foliage is eaten, so that trees are sometimes entirely stripped. When full-grown the caterpillars shed their skin and transform to pupæ, in which stage they remain for about 10 days, after which the adult insects emerge. The female moth measures about two inches across the wings, is of a yellowish-white color, with black markings on the outer edges of the wings. The male is considerably smaller, and of a brown color with similar black markings. The most favored food-plants of the gypsy moth are the apple, the different species of oak, gray birch, alder and willow, but in cases of bad infestation all deciduous trees are injured, with the exception of ash. The moth does enormous injury to tree-growth. There are few insect enemies of the gypsy moth native to New England that cause any noticeable benefit in reducing its numbers. The enemies which have been established by the Bureau of Entomology and are at present destroying the largest number of gypsy-moth caterpillars and pupæ are a Calosoma beetle (*Calosoma sycophanta*); a tachinid fly (*Compsilura concinnata*), and a species of Apanteles (*Apanteles lacteicolor*). These have served greatly to reduce the numbers of the moth in many badly-infested areas, and, when established in large numbers in the infested territory of New England, the gypsy moth will be a very minor destructive factor. Meanwhile hand and mechanical methods of fighting the pest must be continued. These include the collection of egg masses, the destruction of caterpillars under burlap bands placed about the trunks of trees and spraying with arsenate of lead or other arsenical poisons. Creosote, to which a small amount of lamp-black has been added, has been applied with a brush with good results to the egg-clusters between 1 August and 1 April. Tanglefoot bands are also used on tree trunks after the bark has been scraped so that the sticky material can be applied evenly in a thin layer with a paddle. This effectively prevents the caterpillars from ascending the trees. Consult 'Farmers' Bulletin 564' (Washington, 29 Jan. 1914).

GYPSY RELIGION AND FOLKLORE. The gypsy religion, which was originally the old pantheistic conception of the Indo-European tribes, has been so extensively and continuously modified in the course of the centuries of wanderings of the gypsy tribes in many lands that the ancient belief, as a religious system, has disappeared, leaving behind it many curious superstitions, beliefs and practices. The gypsy, being a constant and persistent wanderer, has created no churches, elaborated no system of religion, associated himself, as a race, with no special form of religious belief. In England he is nominally Protestant; in most Catholic countries where he has long resided he has conformed, in a manner, to Catholicism; among the Mohammedans he generally subscribes to the creed of Islam; in Russia and Greece he bows to the tenets of the Greek Church. But everywhere he carries with him more than an echo of the rich, imaginative faith of his Indian ancestors. It is this perhaps more than anything else that binds him to his nomadic life and renders him a factor apart from the life in which he lives. Amulets, charms, nature spirits and mysterious forces, unknowable and inexplicable, form a part of his life. Dreams, omens, signs and the planets exercise, he believes, a constant influence over his being and his actions. His isolation, racially, from the people of the nations among which he resides, his illiteracy, his traditionary lore of very considerable extent and his tenaciousness of tribal customs and practices have continued to mark the gypsy as distinctly as the Jew has been marked, throughout the many centuries during which he, too, has been a wanderer from his native land. Naturally where gypsies live together in large numbers, as in Transylvania, these characteristics are more strongly marked. Here mythology, folklore and curious superstitions, survivals of the very distant past of the race, are abundant, imaginative and varied. Here that attitude of the gypsy toward life and religion is much more pagan than Christian. Yet even here these ancient religious beliefs and social customs and superstitions are strongly influenced by Christianity. The gypsy's religious attitude has ever been so hard to understand that he has been accused of having not only no specific religion but no religious sense. This is not a true view, however. The gypsy's religion, as has been already pointed out, varies according to the country in which he lives; the influences to which he has been subjected; the length of time that these influences have been exerted; the extent of the body of gypsies living together and their tendency to become less nomadic. In England, for instance, the gypsy belief may be said to be Christianity fantastically trapped out with the survivals of an elaborate nature worship. In Austria and Asia the gypsy nature worship has put on the trappings of Christianity but has assimilated little of its spiritual force or its attitude toward life.

The fortune telling and crude astrology of the gypsy are survivals of his tribal religion for the fortune teller is but the modern form of the ancient oracle. In many countries the gypsy still governs his actions by omens and he is even given to reading the signs of nature. He is much of a fatalist and luck and unluck are his constant companions. Palmistry is an "art" that he has handed down for unknown centuries, from father to son, or rather from mother to daughter. The gypsy woman may and does read fortunes to flatter those who try, through her medium, to look into the future. This is but an exhibition of the dishonesty and deceitfulness so often shown by the race. Even though she knows she is not keeping faith with her office and profession, she still firmly believes in the science of palmistry which she has been taught to read; though it is not always to her interest to interpret as she reads. With her ancestors palmistry was a religious rite; and even to-day it is used very much in the ancient sense, to forecast the horoscope of a child and the luck of persons going into new ventures or entering into new relationships in life, as marriage, for instance.

Curious gypsy religious rites and superstitions survive in connection with the marked events in life, as birth, marriage, puberty, sickness and death, all of which seem to have had a very primitive origin. Many of these practices still survive among even small communities of gypsies who have long been subjected to modern civilization and Christianity and who have apparently forgotten the faith of their Asiatic ancestors.

Folklore.— Among the gypsy tribes there exists a vast body of folklore rich in variety, imagery and invention. The gypsy mythology and folktales are curiously suggestive of the primitive Indo-European folklore to which they are first cousins. Fairies, tree-spirits, water-demons, good-people, wind-men, witches of the air, giants, fire-spirits, ghosts, supernatural people, dwellers within the earth, pigmies, kindly disposed helpers like the brownies constitute the more active dramatic personnel of these tales, which are still told around the gypsy camp fire more or less as they were 2,000 years ago except in so far as they have been modified by the exigencies of the modern life of the tribes. Their stage is as broad as the mind of man. It includes the sky and the great starry region above (for the two are separated in gypsy lore) where the stars still hold dominion as they did in the ancient days before the knowledge of physical and natural sciences had come to disturb the mind of the Indo-European and to change his point of view with respect to the universe. It embraces the earth-surface, the waters of the rivers, the lakes and the sea lying between the great cloud-land and the dark under regions. Throughout all these regions wander the spirits created by gypsy fancy as freely as the supernatural characters of an Arabian tale. Supernatural power, magic spells, charms and fetiches form ordinary parts of most gypsy tales which delight in dealing with the supernatural. The gypsy lives still in the age of animism. To him everything in nature is alive (where he is living under his normal conditions and in true gypsy communities). He believes in numerous beings whose goodwill it is to his interest to win. Therefore his tales often deal with the terrible power of witches; and other evil-disposed spirits that accompany certain animals are also favorites with the gypsy folk. These are outwitted by charm, incantations and other supernatural powers in which appears the miraculous efficacy of the Christian cross, often transformed into the trident of the Hindu God Shiva, the Destroyer, the third member of the Hindu trinity. Consequently in gypsy tales of this sort, the cross frequently figures in associations very far from Christian in spirit, for it is pictured as a destroyer as well as a preserver. Sometimes the gypsy hero goes forth to meet his enemies in terrible conflict armed only with the cross; and the destruction he accomplishes by means of its miraculous power recalls, in a more than suggestive manner, the ravages of Shiva the

Terrible, the giver and taker of life. In gypsy tales, too, figure dreams, omens, charms, amulets, curiously yet vividly and realistically associated incantations and mysterious occult powers. From the under-world also come tales strongly reminiscent of ancient Greek, Roman, Persian and Germanic myths. Some of the gypsy tales are very similar to those told by the peasants of Russia; and the spirit that pervades the gypsy relation is more that of Russia than that of the Western world which may indicate that the gypsy is more closely related to the Slav than to the more western Indo-European races. See GYPSIES; GYPSY LANGUAGE.

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GYRATION, Radius of. The energy required to set a body in rotation in any given manner depends on the arrangement of the mass of matter to be rotated. Thus, a mass made into a ring like a wheel with very light spokes requires the expenditure of more energy in order to set it to rotate once per second on its axis than would be required if the same amount of matter were made into a uniform circular plate of the same radius. The energy required to set any given body in rotation with a given angular velocity about any given axis depends, in fact, on the "moment of inertia" of the given body about that axis; and the mass of the body being given, the moment of inertia depends on the way in which the mass is disposed about the axis of rotation. The radius of gyration about a given axis is the distance from that axis at which the whole of the matter of the given body might be concentrated without altering the moment of inertia. The moment of inertia and radius of gyration for any given body about any given axis may be calculated mathematically; the moment of inertia of a body is $\int\int_v\int \rho r^2 dV$, where ρ is the density and r the distance of a variable point from the axis, and the radius of gyration is $\sqrt{\dfrac{\int\int_v\int \rho r^2 dV}{M}}$, where M is the mass of the body. The two magnitudes are evidently of great importance in the theory of rotating bodies.

GYRFALCON. See JERFALCON.

GYRO-COMPASS. Gyroscopic compasses are of two types, known as the single-gyro type and the two-gyro or twin-gyro type. In either type, the directive force is obtained entirely from the rotation of the earth and does not depend even in the slightest degree upon the earth's magnetism. This directive force depends upon the angular movement of the earth only, and it not affected by the linear velocity of the compass through space. Both types make use of the two fundamental principles of the gyroscope, namely, the tendency of a gyroscope to maintain its plane of rotation in space and the phenomenon known as precession.

In the single-gyro type, a single gyroscope is mounted with three degrees of freedom but one of these degrees of freedom is restrained by gravity in such a manner that the gyroscope is made to take up a position with its axis lying in the plane of the earth's axis and with its direction of rotation the same as that of the earth. Owing to the very large angular movements of the ship due to rolling and pitching as compared to the very slow angular movement of the earth, it is necessary to provide means in the form of an auxiliary gyroscope or gyroscopes to neutralize the effect of these movements of the ship.

In the twin-gyro type, we have two gyroscopes mounted with their axes parallel to each other and spinning in opposite directions. These gyroscopes are so controlled that they assist each other in seeking the meridian while the effects due to rolling and pitching of the ship are neutralized.

GYROMANCY, the process of divination by walking around in a circle.

GYROSCOPE, jī'rō-skōp (from the Greek *guros*, a circuit, *skŏpéo*, I see), scientifically, any freely suspended rotating body; technically an instrument making use mechanically of forces developed by rotation and the composition of rotations. The gyroscope is simply a manifestation of the laws of inertia. Its invention is ascribed to Jean Bernard Léon Foucault (1819–68), whose famous experiments with pendulum and gyroscope proved and measured the diurnal motion of the earth. The application of the gyroscopic principle, however, was made many years previously to Foucault's experiments, and the instrument in some of its forms originated probably in Germany or France, toward the end of the 18th century. A form of the instrument is popular as a toy, in the familiar gyroscopic top.

The construction of the gyroscope is such that the axis of rotation can be made to point to some star in the sky. Then, as the heavy disc whirls round, it is found that the axis continues to point to the moving star, though, in consequence of this, apparently altering its direction relatively to bodies on the earth. If, again, the axis be pointed to the celestial pole, which is fixed, no alteration in its position relative to bodies on the earth takes place.

The following lucid exposition of the principles governing the action of the gyroscope is given by Dr. S. Tolver Preston in an article on 'The Mechanics of the Gyroscope' reproduced from "Technics" in the *Scientific American Supplement* of 8 Oct. 1904:

"According to the Newtonian system of dynamics (a system which is now universally recognized and accepted), the velocity of a particle can only be increased in any given direction by the application of a force acting in that direction; conversely, its velocity in a given direction can only be diminished by the application of a force acting in an opposite direction. The magnitude of the applied force is proportional to the rate of increase or decrease of the velocity of that particle.

"Let us suppose that a series of equally heavy particles are arranged around the circumference of the circle in Fig. 1. These particles may be supposed to be rigidly connected one with another, the whole being connected by massless spokes, with an axle passing through *C*, the centre of the circle; this axle being at right angles to the plane of the paper. This arrangement constitutes an ideal flywheel and may be considered typical of an ordinary gyroscope disc.

"Let the flywheel be set in rotation in the direction indicated by the arrow. The problem before us is to determine the nature of the forces which must be applied to the rotating flywheel in order to deviate the axis of rotation. Let us suppose that the flywheel, while still rotating at a uniform velocity about its axle, is constrained in addition to turn about the line *A B*, at right angles to the axle. Looking in the direction *A B*, let the flywheel turn about that line in a clockwise direction, so that the side *L* moves downward through the plane of the paper, while the side *R* moves upward through the same plane. The particles at *e* and *p* being, at the given instant, on the axis of rotation *A B*, will possess no velocity of rotation about that axis. So far as it concerns other particles, their velocities of rotation about *A B* will be proportional to their perpendicular distances from that line. Sixteen equidistant particles on the circumference of the circle have been indicated. The rotational velocities of these particles, about the line *A B*, will be proportional to the respective perpendiculars let fall on *A B*.

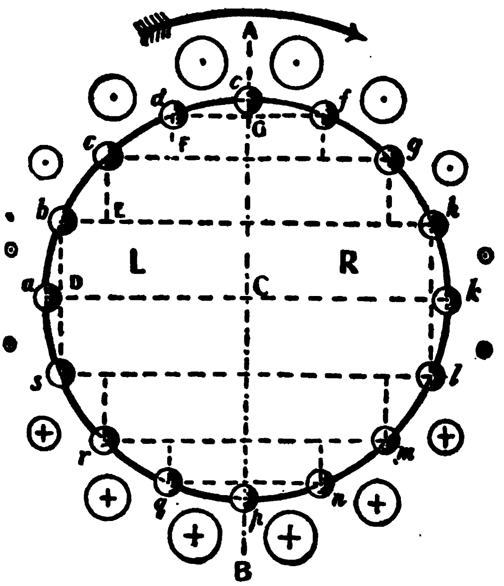

FIG. 1.

"In a certain interval of time the disc will complete a revolution about its axle. In one-sixteenth of this interval of time, the particle *a* will move round the circle so as to attain the position previously occupied by the particle *b*. In doing so, the particle *a* will acquire the velocity previously possessed by the particle *b*, i.e., its velocity about the axis *A B* will be diminished, since *b* is nearer than *a* to the axis *A B*. The diminution of velocity will of course be proportional to *a D*, where *b D* is a line drawn from *b* perpendicular to *C a*. But since the velocity of the particle *a*, in a direction passing vertically downward through the plane of the paper, is diminished as the particle moves from *a* to *b*, this particle must have been acted upon by a force directed vertically upward through the plane of the paper, and proportional to *a D*. This force is indicated by a small circle containing a dot at its centre. The dot indicates the pointed end of an arrow supposed to be directed vertically upward through the paper; while the diameter of the small circle is drawn proportional to *a D*, or to the magnitude of the force.

"While the particle *a* moved to *b*, the particle *b* moved to *c*. In this time the velocity of the particle *b*, perpendicular to the plane of the paper, must have been diminished by an amount proportional to *b E*. A small circle containing a dot at its centre, and of a diameter proportional to *b, E*, indicates the magnitude and direction of the force which must have been applied to the particle as it moved from *b* to *c*.

"The force which acted on the particle *c* as it moved to *d*, and that which acted on the particle *d* as it moved to *e*, are represented in a similar manner.

"Owing to the rotation about the line *A B*, all particles on the right-hand side of the disc are moving upward through the plane of the paper; thus it follows that the particle *e*, in moving to the position *f*, must have acquired a velocity, directed vertically upward through the paper, proportional to *G f*. It must, therefore, have been acted upon by a force, proportional to *G f*, directed vertically upward through the paper. The forces acting on the particles *f, g, h*, can be determined in a similar manner.

"It is obvious that the velocity of the particle *k*, directed upward through the plane of the paper, is diminished as that particle moves to the position previously occupied by the particle *l*. Consequently, it must have been acted upon by a force, of which the magnitude is determined in the manner previously explained, acting downward through the plane of the paper. A circle, of which the diameter is proportional to this force, while the cross at its centre represents the feathered end of an arrow directed downward through the paper, indicates the magnitude and direction of the force acting on the particle *k* as it moved to *l*. The forces acting on the particles, *l, m, n, p, q, r, s*, are determined similarly, and represented by circles containing crosses, to indicate that the forces act downward through the plane of the paper.

"A glance at Fig. 1 shows that all forces acting on the part of the flywheel above the line *a k*, are directed upward through the plane of the paper; while all forces acting on the part of the flywheel below the line *a k*, are directed downward through the plane of the paper. All the forces acting above the line *a k* might be replaced by a single resultant force, acting upward through the paper at some point on the line *C e*; while all the forces acting below the line *a k* might be replaced by a single resultant acting downward through the paper at some point in the line *C p*. These two resultant forces, acting parallel to each other, but in opposite directions, constitute a couple, and produce a torque or turning moment about the line *a k*. Thus, in order to turn the revolving flywheel about the diameter *e p*, we must apply a torque which, if it acted on the stationary flywheel, would turn it about the perpendicular diameter *a k*. Conversely, if we apply a torque tending to turn the flywheel about a diameter *a k*, it will turn, not about *a k* (as might have been expected), but about the perpendicular diameter *e p*.

“The torque necessary to deflect the flywheel might be produced by forces acting directly upon it, as for instance, by blowing air on the upper half of the flywheel from the back, and on the lower half from the front. Generally, however, it is more convenient to act on the axle, the end above the plane of the paper being urged in the direction *C B*, while the end below the plane of the paper is urged by an equal force, in the direction *C A*.

“Some further points should be noted. Any force acting to the right of the line *A B* is equal, both in magnitude and direction, to a corresponding force acting to the left of the same line. Consequently as the flywheel turns about the axis *A B*, no work will be performed by the forces producing this rotation. This follows from the circumstance that whereas one force acts in the direction of motion (so far as relates to rotation about the axis *A B*) the other equal force is opposed to that motion.

“The actual behavior of a gyroscope can now be easily understood. The flywheel *a a* (Fig. 2) having been set in rapid rotation in the direction indicated by the arrow *r*, the frame carrying it is supported from a projection *n* at one end, on a pivot *o*. Instead of falling to the ground, as it would do if it were not rotating, the gyroscope remains with its axis *b s* horizontal; but the axis turns in a horizontal plane about the point of support *o*, in the direction indicated by the arrow *s*. The torque produced by the pull of gravity is easily seen to be that required to turn the flywheel *a a* about a vertical diameter in the direction mentioned. The fact that the flywheel, besides rotating about a vertical axis, also revolves in a circle about the point *o* as centre, is merely due to the circumstance that, under the conditions of the experiment, the rotation cannot occur without the revolution.

“It is instructive to consider the same problem from a somewhat different standpoint. We have already determined the nature of the applied forces required to turn the ideal rotating flywheel (Fig. 1) about the axis *A B*, in a clockwise direction when viewed from *A*. We found that a torque must be applied which tends to urge the end of the axle above the plane of the paper in the direction *C B*, and the opposite end of the axle in the direction *C A*. It will now be proved that the reaction of the rotating flywheel, when it turns as above, about the axis *A B*, produces a torque which tends to urge the end of the axle above the plane of the paper in the direction *C A*, and the other end of the axle in the direction *C B*.

“Under the given conditions, the component velocities, downward through the plane of the paper, of the particles *a, b, c, d*, are all being diminished; and the consequent reactions tend to turn the axle in a clockwise direction, about the line *k a*, when viewed from the side *k*. The component velocities, upward through the plane of the paper, of the particles *e, f, g, h*, are all being increased, and the consequent reactions tend to turn the axle in the same direction. It is easily seen that the reactions due to the alterations in the velocities of the particles *k, l, m, n, p, q, r, s*, all tend to turn the axle of the flywheel in the same direction. Thus the torque due to the reaction of the rotating flywheel when turning about the axis *A B*, is of the character specified above.

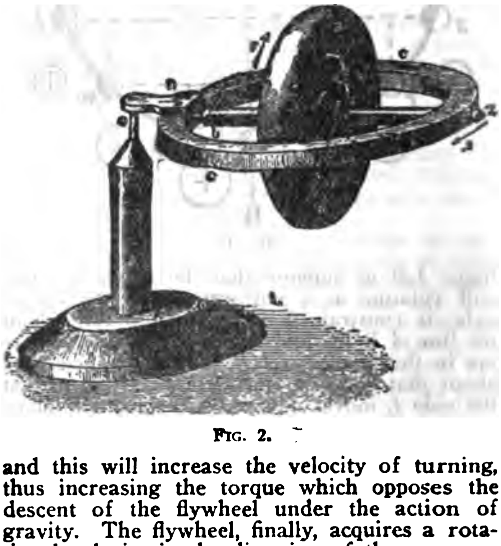

Fig. 2.

“The precise way in which the gyroscope (Fig. 2) acts can now be readily followed. When the frame carrying the rotating flywheel *a a* is first supported on the pivot *o*, the initial tendency is for the whole to descend toward the earth, under the action of gravity. But the pivot *o* prevents the end *b* of the axle from descending, so that an incipient rotation about a horizontal diameter commences. The reaction due to this rotation produces a torque which tends to turn the flywheel about a vertical diameter in the direction of the arrow *s*. As the flywheel is free to turn in this direction, it at once commences to do so, and in so doing generates a reacting torque opposing the incipient rotation produced by gravity. The action of gravity being opposed, the rate of (incipient) descent of the flywheel is diminished; but so long as descent continues, a torque acting in the direction of the arrow *s* will be produced, and this will increase the velocity of turning, thus increasing the torque which opposes the descent of the flywheel under the action of gravity. The flywheel, finally, acquires a rotational velocity in the direction of the arrow *s*, which produces a reacting torque just equal and opposite to that due to the pull of gravity. If friction were entirely absent, the flywheel would then cease to descend, and would continue to turn at a uniform rate in the direction of the arrow *s*. In this process, the work performed is that due to the incipient descent of the flywheel; this work is just sufficient to supply the kinetic energy due to the rotation of the flywheel and its supporting framework about the axis o. When the permanent condition outlined above has been attained, no further work is done in the absence of friction. If there is friction between the supporting lug n, and the pivot o, the gyroscope will slowly descend, at such a rate that the work performed by gravity is just equal to that needed to overcome the frictional drag.

«In the absence of friction, it is obvious that the gyroscope turns about o as centre merely by virtue of its own inertia, after the final state has been reached; in this respect the motion resembles that of a planet around the sun. The torque due to gravity, though necessary, only serves the purpose of neutralizing the reacting torque which the turning of the flywheel about a vertical diameter produces.» From the foregoing it is seen that gyroscopic action depends upon four dominant factors: (1) the moment of inertia of the rotating flywheel — that is, its diameter multiplied by its weight as distributed relatively to its axis of rotation; (2) its freedom to incline its axis of rotation in two directions; (3) the velocity with which the axis is thus inclined; (4) the velocity with which the flywheel is rotating.»

Mr. C. M. Brownall also, in a treatise on 'The Gyroscope, an Explanation without Mathematics,' published in the *Scientific American Supplement* of 10 Aug. 1907, summarizes the action of the gyroscope force as follows:

«I. The gyroscopic force always acts at right angles to the plane of motion of the axis, neither accelerating nor retarding it and only tending to change its direction. The gyroscopic force is of the nature of a couple, and can only be balanced by an equal couple.

«II. The gyroscopic force is greater, other things being equal, as the velocity of motion of the axis is greater, as the velocity of rotation of the wheel is greater, as the mass of the wheel is greater and as this mass is more distantly situated as regards the centre of the wheel.»

Practical application of the gyroscope dates back to 1744 when it was used to provide an artificial horizon for mariners at sea. Aside from its use as a fixed reference plane in clinometers and recorders, the gyroscope has been utilized in two contrary directions: (1) To produce motion in a suspended body at rest; and (2) to control the motion or the direction of motion of moving bodies. In the former field the most notable results have been in rolling a ship which is aground on a bar, so as to loosen it and permit its easier release; and its adaptation to ice-breaking vessels so as to cause them to roll, thus adding enormously to their effectiveness. In the latter field the gyroscope was applied first to controlling the tendency of torpedoes to wander, and to hold it constant to the direction in which it was aimed. The next application, and one of the most importance, was the development of the gyro-compass, an instrument far more reliable and accurate than the old magnetic compass with all its errors and deviations, and with the further advantage that it gives true north bearing, and not that of the wandering magnetic pole. This instrument is now used in many of the naval vessels throughout the world. The next application was to prevent the rolling of ships, thus increasing the comfort of those on board, and, in the case of naval vessels, providing a level gun platform, which is of the greatest advantage in securing a larger number of hits. As all rolling of ships is the result of successive wave increments, the gyroscopic stabilizers need only be large enough to counteract each of these increments as it arrives, and even for large ships the stabilizing gyroscope weighs only about 1 per cent of the displacement. This mechanism has been successfully applied to various type and sizes of vessels ranging from 100 to 10,000 tons. The aeroplane stabilizer is another adaptation of the greatest importance, hardly yet emerged from the experimental stage, but already recognized as of great potentiality. The gyro-cars and gyro-automobiles have not achieved commercial importance, their advantages being more than counterbalanced by operative difficulties. (See ÆROPLANES; GYRO-COMPASS; MONORAIL SYSTEMS; STEAMSHIPS; TORPEDO). Consult Chatley, H., 'Practical Gyrostatic Balancing' (London 1912); Cordeiro, F. J. B., 'The Gyroscope' (New York 1913); Crabtree, H., 'Spinning Tops and Gyroscopic Motion' (London 1914); Johnson, V. E., 'The Gyroscope: An Experimental Study' (London 1911); Worthington, A. M., 'Dynamics of Rotation' (London 1899).

GZOWSKI, gzhŏv'ski, SIR **Casimir Stanislaus**, Canadian engineer: b. Saint Petersburg, Russia, 1813; d. Canada, 1898. He studied military engineering at Kremnitz, and joined the army. However, his sympathies with the Polish patriots soon caused him to abandon this post, in order to enlist his services in their cause. For this, he was banished, and came to the United States in 1833. Here he taught various subjects, studied law at Pittsfield, Mass., and later practised in Pennsylvania. In 1841 he removed to Toronto, where he had secured a position in the department of public works, resuming his original profession. In the following year he was appointed superintending engineer of roads and harbors in western Ontario. From 1850 to 1853 he was in charge of Montreal Harbor, and chief engineer of the Saint Lawrence and Atlantic Railway Company. After several years as partner in a railway firm, he was entrusted with the construction of the International Bridge across the Niagara River (1871), and also presented plans for the enlargement of the Welland Canal and the Baie Verte Canal. In the military service Gzowski was elevated to the rank of colonel in 1879, and was president of the Rifle Association of the Dominion of Canada. He was also the first president of the Society of Canadian Civil Engineers, and was created a knight in 1890.

H

H THE eighth letter of the English and other alphabets derived from the alphabet of the Latins. It was borrowed by the Latins from the alphabet of the Greeks, and in early Greek represented an aspirate consonant sound, but in the Greek of classical times it stands for the prolonged vowel sound of *e*, as omega (ω) stands for the prolonged sound of omicron (ο). The H is evidently a character borrowed from the Phœnician alphabet, where its form was β and its sound guttural aspirate, like that of the corresponding Hebrew letter *cheth* or like *ch* in German and in Scotch. In Greek, after H was adopted as a vowel sign, the aspirate was represented by ʽ or ʻ either prefixed to a letter (ʽo) or written above it (ὁ): it was previous to this change that H was introduced into the Latin alphabet. It is probable that in early Latin this letter, occurring between two vowels, as in *nihil, mihi, traho, veho,* represented a guttural sound, as the *h* in *nihil* and *mihi* does still in the Italian pronounciation of Latin. But evidence exists that in the classical usage of ancient Latin speech initial *h* was of little account and was «silent» as in modern Italian and French: this is certain as regards the pronunciation of the vulgar; and that even the educated often «dropped the h's» we know from the fact that in ancient monuments we find Hannibal and Annibal, Hadria and Adria, herus and erus, haruspex and aruspex.

In Anglo-Saxon and earliest English speech *h* represents a guttural aspirate like German and Scotch *ch* in *ach, loch;* for example, in *niht* (night), *thoht* (thought) the *h* stood for the same sound as *ch* in the German words *nacht, gedacht.* In the earliest English speech *h* was prefixed to *l, n,* and *r,* to represent a guttural aspirate which is now entirely lost; examples, *hlaf* (loaf), *hnecca* (neck) *hring* (ring): the initial guttural in such words has been dropped. Thus in the names of the early Frankish kings Hlodowig became Ludovicus and Louis, and Hlothar became Lothair. The original guttural *h* in old High German *hros* is completely eliminated in the modern German *ross,* but is represented by the aspirate *h* in Old English *hors* (horse). The *h* after *w* in many words as wharf, what, when, etc., represents an initial aspirate in Old English hwarf, hwaet, hwaenne, etc., and is still so pronounced.

H is added to various consonants to form digraphs for representation of various sounds, for example, *ch* as in chin, *sh* as in shy, *gh* as in gherkin, *th* as in thin, then; or even to represent sounds for which there is already a proper consonant in the alphabet, for example *ph* and *gh* for the sound of *f* (philter, rough), *ch* for the sound of *k* (chyle); in very many cases the digraph *gh* is employed simply as a memorial of an ancient etymology, as in plough, and not seldom for no discernible purpose at all, as in ghost; the form *rh* usually occurs in words of Greek origin, and recalls the Greek etymology (rhapsody), but again it is employed to suggest false Greek etymology (rhyme).

H. H. See Jackson, Helen Maria Fiske Hunt.

HAAG, häg, **J. Carl,** German-British painter: b. Erlangen, Bavaria, 1820; d. Oberwesel, Germany, 1915. After studying at Nuremberg, Munich and Rome, he became court painter to the Duke of Saxe-Coburg and Gotha. In 1847 he moved to England where he devoted himself to water color painting. In 1853 he became a member of the Royal Society of Painters in Water Colors. He traveled also in the East, the Balkans and among the Bedouins, and his pictures of these countries and peoples gained him a considerable reputation. They are careful in drawing and remarkable in their brilliant color effects. His studies of the Holy Land are also noteworthy. Haag was painter to Queen Victoria for a few years during which time he accompanied the queen on her travels to Scotland. At the age of 82 he retired to the Red Tower at Oberwesel on the Rhine where he passed his remaining years.

HAAKON, hâ'kŏn', the name of several Norwegian rulers: (1) Haakon the Good, son of Harald Haarfager. He was brought up by Athelstane of England, and trained in the Christian religion. In 933, on the death of his father, he set out with a fleet which had been furnished by Athelstane to conquer his half-brother, Eric, who had usurped the throne. The expedition was successful and Haakon established himself as king, reigning from about 934 to 961. His efforts to introduce Christianity into his kingdom were not thoroughly successful. Haakon was killed in the battle of Fitje in 961. (2) Haakon Magnusson ruled about 1093–95. (3) Haakon Herdebred ruled from 1147–62. (4) Haakon Haakonsson, or Haakon IV, named «The Old»: b. 1204; d. 1263. He was the grandson of Sverre, and the son of Haakon III (king 1202–04). The principal events of his reign were the expeditions against the Hebrides and the submission of Iceland and Greenland (1262). (5) Haakon Magnusson «the Younger,» son of Magnus Erikson, king of Norway and Sweden. He became king of Norway in 1343, his father acting as regent until Haakon became of age. From 1362–63 he was ruler of Sweden, and his marriage to Margaret, Princess of Denmark, was one of the first steps toward the conciliation of the three kingdoms of Scandinavia.

HAAKON VII, king of Norway: b. 3 Aug. 1872. He is the second son (named Karl) of Frederick, king of Denmark. On 26 Oct. 1905 the union between Sweden and Norway was formally dissolved, and on 18 November of the same year Crown Prince Karl of Denmark was elected king of Norway by the Storting. The coronation took place at Trondhjem in June 1906. In 1896, he married Princess Maud, daughter of Edward VII of England. Their son and heir was born 2 July 1903, and was named Olaf.

HAANEL, hä'nĕl, **Eugene**, American physicist and mineralogist: b. Breslau, Germany, 1841. After studying in Germany, he emigrated to the United States in 1856, and later took part in the Civil War on the Federal side. In 1864 he was professor of modern languages at Adrian College, and in the succeeding year at Hillsdale College. From 1868–72, he held the chair of natural science at Albion College, Michigan; of physics and mineralogy at Victoria University, Coburg, Canada, from 1872–89; and subsequently of physics at Syracuse University, until 1901. In 1908 he was appointed director of mines for Canada, and in 1909 became vice-president of the American Institute of Chemical Engineers. His principal researches have been made along the lines of the electro-thermic processes in iron-ore smelting, and of the use of peat as fuel. Among his publications are 'Report on Experiments Made at Sault Sainte Marie in the Smelting of Canadian Iron Ores by Electro-Thermic Processes' (1907); and 'Experience in the Use of Peat Fuel from the Government Plant at Alfred, Ont.' (1911).

HAARLEM, här'lĕm, Holland, the capital of the province of North Holland, 11 miles by rail west of Amsterdam, and five miles from the North Sea. The city is intersected by canals bordered by tree-lined avenues, and communicates with the Zuyder Zee by the Spaarne and the Ij. Its chief municipal building is the town hall, a 17th century palace of the counts of Holland, containing a library, art and historical collections. In Haarlem wood a favorite pleasure resort is the pavilion housing the Society for the Promotion of Industry, and containing the colonial and industrial museums. Chief among numerous educational institutions is the Teyler Museum, for the study of theology, natural science and the fine arts. The finest ecclesiastical structure is Saint Bavo's or the Groote Kerk, a 15th century late Gothic basilica, one of the largest churches in Holland, noted for its tower 260 feet high, and its large organ. Haarlem was important commercially as early as the 12th century, and although its manufacturing industries have declined, has cotton-mills, linen bleacheries, type foundries, tram and railway carriage works, breweries, and a great trade in the cultivation of bulbs, etc. The oldest printing office in Holland is located here. The town suffered during the revolt of the peasantry in 1492 and was deprived of its privileges by Albert of Saxony. During the war of independence it sustained a siege of seven months (1572–73) by the Spaniards, and capitulated only after a display of the noblest heroism and courage. It was retaken by the Prince of Orange in 1577. Pop. 70,491.

HAARLEM LAKE (Dutch, Haarlemmer Meer), a district in the province of North Holland. In former times it was a lake, one of four smaller bodies of water which were united by successive inundations into one large lake. The area covered increased to some 45,000 acres. In 1836 a storm caused a serious overflow, threatening Amsterdam and Leyden, and the government authorities, who had hitherto neglected various proposals for the drainage of the lake, began the work in May 1839. By 1853, 42,096 acres had been reclaimed. The soil is fertile, and contains profitable salt springs also. Pop. about 20,000.

HAASE, hä'zĕ, **Friedrich**, German actor: b. Berlin, 1 Nov. 1827; d. 1911. He was the son of the valet of Friedrich Wilhelm IV, who had him educated for the stage. He studied under Ludwig Tieck and appeared for the first time at Weimar in 1846. He acted at the leading theatres of German cities as well as in Saint Petersburg (1860–66), and the United States (1869, and again in 1882–83). He was manager of the court theatre at Coburg, of the Stadt Theatre at Leipzig (1870–76), and was thereafter a zealous supporter of the Deutsches Theatre at Berlin. His principal rôles were in high comedy, for which his aristocratic bearing especially suited him. Among them may be mentioned his parts in Gutzkow's 'Königsleutnant,' in which he played Count Thorane; the elder Klingsberg in 'Die beiden Klingsberg'; Chevalier Rocheferrier in 'Eine Partie Piquet'; Richelieu in the play of the same name; and the prince in 'Der geheime Agent.' He wrote 'Ungeschichte Briefe' and 'Was ich erlebte, 1846–1898' (Berlin 1898). Consult Simon, 'Friedrich Haase' (Berlin 1898).

HAASE, Heinrich Gottlob Friedrich Christian, German scholar: b. Madgeburg, Prussia, 1808; d. Breslau, 1867. He received his education at Halle, Griefswald and Berlin, and studied also in the libraries of Paris, Heidelberg, Strassburg and Bern. In 1840 he became professor of philology at the University of Breslau, and remained at that institution until his death, serving also as one of the directors of the Philological Seminary there from 1851. In addition to his splendid work as a teacher, Haase is well known for his scholarly editions of the classics and his philological treatises, among which are his editions of Xenophon's '*Λακεδαιμονιμν πολιτεια*.' (1833); of Thucydides (1840, with a Latin translation); of Velleius Paterculus (1858); of Seneca, the philosopher (2d ed., 1872, still unequalled); and Tacitus (1855, with a splendid introduction in Latin). His 'Vorlesungen über lateinische Sprachwissenschaft' (1847–80) was edited posthumously by F. A. Eckstein and H. Peter. Consult Bursian, C., 'Geschichte der klassischen Philologie in Deutschland' (1883); Fickert, G., 'Friderici Haasii memoria' (1868); Sandys, 'A History of Classical Scholarship' (Vol. III, Cambridge 1908).

HAAST, häst, Sir **Johann Francis Julius von**, German-British geologist: b. Bonn, Germany, 1 May 1824; d. Wellington, New Zealand, 15 Aug. 1887. He studied at Bonn, and went in 1858 to New Zealand on a tour of exploration. Here he was employed by the government of the colonies to conduct investigations of the geological phenomena of the district with the purpose of locating mineral resources, etc. He discovered gold and coal deposits in Nelson. Canterbury province appointed him surveyor-general of the interior, which office he held from 1861–71. He prepared important geological and topographical maps of those districts, for which he was awarded the gold medal of the Royal Geographical Society. As founder and director of the Canterbury Museum at Christchurch he succeeded in gathering together a most valuable collection. He also occupied the chair of geology at Canterbury College. The gigantic extinct birds, Dinornis and Palapteryx were discovered by him in his researches in New Zealand. In 1867 he was elected Fellow of the Royal Society and was knighted in 1887. He published 'Geology of the Provinces of Canterbury and Westland, N. Z.' (1879).

HABAKKUK, Book of. The question of authorship is puzzling. The book can hardly be by a single author. But there is a great diversity in the opinions concerning the details of authorship. The views that seem most probable are here indicated.

The first portion of the book consists of i, 2–11. In this the prophet first cries to Yahweh for judgment upon the wicked, i, 2–4. The answer of Yahweh in 5–11 says that he is raising up an instrument of punishment upon the wicked, the Chaldeans, expressly named in verse 6, who are then described. The reference to the Chaldeans fixes the time of this portion with much definiteness. It is after the Chaldeans have become a prominent power, doubtless after the battle of Carchemish in 605, in which the Chaldeans established their supremacy over the Egyptians. The wicked referred to in 2–4 are then the people of Judah, particularly the king and court. The time is soon after 605, and must have been before 597, when the punishment actually descended upon Judah. The whole treatment shows that the Chaldeans are considered a new power which Yahweh raises up, verse 6, which sets itself in opposition to the kings and princes of the earth, verse 10.

Beginning with i, 12 the parties concerned are in a different relation. The wicked here, verse 13, are not the same as in verse 4; they are the instrument of correction, verse 12, as the Chaldeans were in 5–11, and the prophet protests against the excess of correction which they are inflicting. The nation here in mind, also, is not a new power, but has a long career of violence, i, 15; ii, 8. The nation in mind is not named, but the natural supposition is that it refers to the chief oppressive nation, the Chaldeans, and was written toward the end of the Babylonian exile, about 550. There seems no reason to doubt that the most of i, 12– ii, 20 is by a single author, with the date just indicated. The third malediction, ii, 12–14, is made up of quotations, not entirely verbatim, from Micah, Jeremiah and Isaiah. This is out of accord with the style of the remainder of this portion, and doubtless marks this as a later addition, with which goes the preceding verse, 11, which introduces this malediction. The author of this portion writes it as a supplement to the earlier oracle. There the Chaldeans had been introduced as the instrument of punishment on Judah; here the author, under the later conditions, protests against the excess of this punishment, and calls for punishment upon the Chaldeans. This is the thought of i, 12–17. Yahweh gives the assurance, in ii, 1–5, that the righteous shall live, and the oppressing nation shall be visited with the maledictions which follow. Of these there are five, of which the third, as already indicated, is probably a later addition. These maledictions are pronounced upon the Chaldeans for their oppressive violence, 6b–8, their evil gain at the expense of other peoples, 9–11, the cruelty and crime by which their cities were built, 12–14, their barbarous delight in reducing other nations to helplessness, 15–17, and their senseless idolatry, 19–20, 18 being a later prosaic addition.

Chapter iii is entirely distinct from the remainder of the book. This is a psalm, similar to those in the book of Psalms. It bears a title like those found in Psalms. This title shows that it was in the Director's Psalter, one of the larger and more prominent of the smaller collections which preceded the present book of Psalms. The Director's Psalter was probably compiled in the early Greek period. This psalm seems to have been of postexilic composition. It seems clear that neither author of the earlier part of the book had anything to do with this psalm. It probably bore the title in the Director's Psalter which attributes it to Habakkuk, which led an editor to attach it to this book. Presumably the author of the first part of chapter i, was Habakkuk. The psalm is one of great poetic vigor and imaginative fire. It depicts a theophany, Yahweh coming to judgment. The psalm has no specific points of contact with the rest of the book, it is much more general in its nature.

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HABBERTON, John, American author: b. Brooklyn, N. Y., 24 Feb. 1842. At first a printer he subsequently served in the Federal army, and later undertook editorial work in New York. His best-known book, 'Helen's Babies' (1876), attained great popularity both in America and in Europe. He has published also 'The Barton Experiment' (1877); 'Other People's Children' (1877); 'The Worst Boy in Town' (1880); 'Who was Paul Grayson?' (1881); a humorous 'Life of Washington' (1883); 'One Tramp' (1884); 'Brueton's Bayou' (1886); 'The Chautauquans' (1891); 'A Lonely Lover' (1893); 'The Tiger and the Insect' (1902); 'The Bowsham Puzzle'; 'Country Luck'; 'Little Guzzy'; 'Caleb Wright'; 'When Boys Were Men'; 'Budge and Toddie' (1909). His only drama, 'Deacon Crankett,' was performed more than 500 times.

HABEAS CORPUS. The provision of Magna Charter, guaranteeing every freeman from being "taken or imprisoned . . . but by lawful judgment of his peers of the law of the land," is merely declaratory of an immemorial right. From the earliest times it was the privilege of persons accused to go at large pending trial and judgment, on giving surety, and this privilege had been regularized by William the Conqueror, through the institution of "frank-pledge," whereby groups of 10 men in every shire hundred became hostages for each other's good conduct, and for the appearance of either to answer any charge that might be laid to him. The vague but great powers anciently enjoyed by sheriffs, and their ill-defined discretion, enabled these officers to hold persons on suspicion, without commitment and without bail, to remedy which abuses various writs were invented and issued by the chancery office commanding the production of prisoners thus detained. One of these, the *writ de homino replegiando*, was applied also to cases where persons were not held by any official authority, much as the writ of *habeas corpus* is nowadays employed in cases where the right of a parent or guardian, or an institution, to the custody of a child or ward is in dispute. But the power of the superior courts to bail in criminal actions, even for high treason, has never been questioned; and in these and other cases involving a restraint of liberty the writ of *habeas corpus* answered all purposes in a simpler and more direct way than any other writ. The Courts of Common Pleas and Exchequer originally had to issue the writ under the fiction that the person requiring it was privileged, or was to be sued in the court from which it was issued; but the Lord Chancellor and the judges of the King's Bench issued the same without circumlocution from the beginning of English legal history. The promise made by King John in the Great Charter — "we will sell to no man, we will not deny nor delay to any man, either right or justice —" would not have been exacted, however, without cause; and the most probable reason would have been sales, denials and delays of justice and right, which the sovereign for himself and his successors agreed should never thereafter occur again. That the promise has always been kept it would be unveracious to assert. To be sure, "the king can do no wrong," but his judges, ministers and privy councils can.

In earlier practice the writ of *habeas corpus* had several uses; i.e, to remove a defendant and the record of his case from the jurisdiction of an inferior to a superior court, or to remove a prisoner to be tried from his place of confinement into the jurisdiction where the alleged crime was committed. These and some other variations of the writ have become obsolete; though the writ of *habeas corpus ad testificandum* is still frequently resorted to for the purpose of bringing into court a prisoner in custody whose testimony as a witness is desired. When the great "writ of right" is spoken of, the office of which is to give security to all persons from unlawful detention and restraint of liberty, the term *habeas corpus* is used without adjectival appendices. The writ is issued on the petition of a person in custody, or of one who claims to be the rightful custodian of a person unlawfully held by another. It requires the officer or other individual, charged with unlawfully detaining a person, to produce — literally to have the body of — that person, before the judge issuing the writ, immediately, so that the ground of detention may be inquired into and the person held in confinement may be released without delay if unlawfully detained. If the petitioner be in custody of an officer of the law and the latter have a warrant, specifying a lawful reason for the arrest, detention and commitment of the prisoner, the matter ends there. The merits of the case cannot be inquired into on the return of the writ and the most the judge can do is to bail the petitioner if he considers it a bailable case. It was due to a total disability to understand the difference between law and royal prerogative in a little matter like freedom of locomotion that a distant successor of King John completely lost his head. It is true, that Charles I was ill-advised and badly served by subservient judges. The warden of the Fleet prison had made returns to writs of *habeas corpus*, stating that the prisoners, in whose behalf they had been obtained, were confined by warrant of the privy council, and committed by special command of the king. Though counsel for the prisoners insisted that the council was bound to assign a sufficient cause of commitment, just as any petty magistrate would be, the judges decided that the royal mandate was warrant enough for any arrest and detention. This decision destroyed every constitutional and statutory guaranty of liberty from Magna Charta down. It raised an uproar, which ended in revolution, the trial and decapitation of Charles I and the establishment of the Commonwealth under Cromwell. The king meanwhile had been forced to consent to the Petition of Right, sometimes called the first Habeas Corpus Act; but this was made nugatory to a great extent by the refusal of the judges to issue the writ during vacation, so that between terms of court prisoners committed unlawfully and without bail had no remedy.

Not until after the Restoration was the famous Habeas Corpus Act passed — (31 Car. II, chap. 2). This act was carried in the House of Lords by an artifice. "Lords Gray and Norreys were named to be tellers. Lord Norreys, being a man subject to vapors, was not at all attentive, so, a very fat lord coming in, Lord Gray counted him for 10, as a jest at first; but seeing Lord Norreys had not observed it, he went on with this misreckoning of 10, so it was reported to the house and declared that they who were for the bill were the majority, though it indeed went to the other side." — Bishop Burnett, 'History of his Own Times' (Oxford ed., 1833). The act provides that any person committed to prison "for any crime, unless for treason or felony plainly expressed in the warrant of commitment," may obtain a writ of *habeas corpus* from the Lord Chancellor or any judge of the common law courts, in vacation or in term time. Judges refusing to issue the writ are penalized; and jailers who fail to exhibit the warrant of commitment to a prisoner or his counsel on demand, or who shift prisoners from their custody to that of another officer, are subject to fine and disqualification from office. A return to the writ must be made in three days (or in not more than 20 days, if the distance of the place of confinement from the court be great). Upon the return of the writ the judge is required to admit the prisoner to bail. Prisoners committed on charges of treason or felony, if not bailed, may insist upon being tried at the next assizes, and if not tried at the second assizes following commitment they must be discharged. To provide for cases where persons are not held in custody on criminal charges, but are restrained of liberty in any other manner, imprisonment for debt excepted, the statute of 56 Geo. III was passed.

The American Habeas Corpus Acts closely follow the English statutes. Imprisonment for debt has been almost everywhere abolished, however, and even fraudulent debtors are discharged «on the limits,» that is to say they may give bail not to remove from the county. The Constitution of the United States declares that the «privilege of the writ of *habeas corpus* shall not be suspended, unless, when in cases of rebellion or invasion, the public safety may require it.» During the Civil War the President authorized General Scott to suspend the privilege when in his judgment it seemed necessary to do so; but Chief Justice Taney, who had issued a writ which the general refused to obey, uttered the opinion that the power of suspension resided solely in Congress. Judicial and professional opinion appears to concur in this view; but the Act of Congress of 3 March 1863 authorized the President to suspend the writ; and this delegated power was exercised not only by Lincoln during the war, but by Grant during the reconstruction period in 1871. By Act of Congress 24 Sept. 1789, it was provided that writs of *habeas corpus* should be issued by Federal judges only in cases where prisoners are in custody «by color of the authority of the United States,» or are committed for trial, or are required as witnesses to testify, in a Federal court. The Act of 2 March 1833 extended this power so that the writ might issue for prisoners held for violation of the Constitution, or of a treaty of the United States, even when in the custody of the authorities or the courts of a State. The Act of 29 Aug. 1842, gives to the Federal courts and judges exclusive power to issue the writ when the prisoner is the subject of a foreign power, held for an act done under a commission from his government, and a question of international law is involved. The State courts are precluded from issuing the writ in the cases mentioned. See HIGH TREASON.

STEPHEN PFEIL.

HABER, hä'bėr, **Fritz**, German chemist: b. Breslau, 1868. After studying at Berlin, Heidelberg and Charlottenburg, he taught chemistry, becoming professor at the technical high school at Karlsruhe in 1911. Later he became professor of physical chemistry and director of chemical investigations at the University of Berlin. His principal contribution to practical chemistry has been his discovery (with Dr. Carl Bosch) of the synthetic process of manufacturing ammonia. He has contributed many articles to technical journals on ammonia, and is the author of 'Grundniss der technischen Elektrochemie' (1898); 'Thermodynamik technische Gasreaktionen' (1905, Eng. trans. by A. B. Lamb, under the title of 'Thermodynamics of Technical Gas Reactions' (1908).

HABERL, hä'bėrl, **Franz Xaver**, Catholic musician: b. Oberellenbach, Lower Bavaria, 1840; d. 1910. Ordained to the priesthood in 1862, he was appointed conductor of music at the cathedral at Passau, and musical director of the Catholic seminary there. From 1867-70, he served as organist of the cathedral of Santa Maria dell' Anima at Rome, and was at Ratisbon from 1871-82. The School for Church Music was established by him in 1875, and under his able managership soon rose to great prominence. He was editor-in-chief of the works of Palestrina (32 vols., 1894), and from 1880 was editor of the magazine *Musica Sacra*. In 1879 he established a Palestrina Society. Among his published works are 'Magister Choralis' (1865, translated into all European tongues); 'Cäcilien Kalendar' (1876-85); 'Psalterium Vespertinum' (8th ed., 1901); 'Bibliographischer und thematischer Musikkatalog des päpstlichem Kapellarchivs im Vatikan zu Rom' (1888). Haberl was one of the leading modern composers and organists of sacred music.

HABERSTICH, Samuel. See BITTER, ARTHUR.

HABINGTON, William, English poet: b. Hendlip Hall, 4 Nov. 1605; d. 30 Nov. 1654. Of Roman Catholic parentage, he was sent to the college of Saint Omer, but declining to become a Jesuit, he went to Paris where he married Lucy, the second daughter of Baron Powys. To her he wrote a series of poems entitled 'Castara' in which he praises the virtues of his lady in lavish terms. The poems are pompous and rhetorical, but of fine lyric quality and of high moral tone. He also wrote several elegies on the death of George Talbot (1635); 'Historie of Edward the Fourth' (1640); a tragi-comedy, 'The Queene of Arragon' (1640) and 'Observations upon History' (1641). Consult Arber, E., 'English Reprints' (1870); and Ward, 'English Poets' (Vol. II, London 1880-83). 'Castara' was edited by Charles Elton (1812).

HABIT AS A PSYCHOLOGICAL PHENOMENON. It is difficult to overestimate the importance of habit in our every-day life and the part that must be assigned to it in the explanation of both thought and action. In the adult practically no act is independent of habit. Few social phenomena can be understood without taking the common habits of the individuals into consideration. Habit frees the individual from the need of constant thought and enables him to devote himself to the general ends to be attained and to the acquisition of new skill. Habit in others makes it possible to rely upon the action of one's fellows and to forecast the social events of days to come. All business depends upon knowledge of the set of habits in the men with whom one deals.

All complex acts depend upon earlier formed habits which co-ordinate the different movements to the accomplishment of a single end. In learning to drive a car one must at first think of each act, of each lever to be moved, of each movement of the steering wheel. After learning is complete one merely decides to turn and the steering gear is adjusted by sight of the road to be taken. One decides to stop and the clutch is released and the brakes are applied as parts of a single movement and without other thought. The more complicated movements learned in infancy, such as speech, depend in the same way upon groups of habits. Speaking a word requires the simultaneous or suitably successive activity of a large number of muscles in many different combinations. Were it necessary to think of each movement or of each element in the movement and adjust its response in strength and time to the whole, accurate speech would be impossible. One may assert with confidence that no one of the apparently simple acts could be executed were it not for the mass of habits at the individual's command.

In its wider effects habit holds mankind as a whole and the individual in particular to a regular routine, to consistent lines of conduct. Hours of labor and of recreation, hours of sleep and time of waking, are all determined by habits which, it is true, are broken from time to time but hold in general for all. So firmly set is this daily rhythm of habits that when the community desires to adapt itself better to the setting or the rising of the sun, it turns the clock forward or back rather than break the connection that has been established between the position of the hands of the clock and the actions of its members. Very many of the more important social functions, the acceptance of the results of an election in a well ordered democracy, or obedience to the command of a monarch or of the military authorities in an autocracy, are matters of habit. Only a great common emotion, great pain or stress of other kind can break the habits sufficiently for disobedience or disorder to be even considered. It is in this sense that habit is the great conservative force that makes orderly government possible, that keeps each individual in society in his place and to his allotted task.

In the social whole as in the individual the formation of habit saves thought and prevents confusion. The well-drilled soldier or military unit needs no time to agree upon a course of action or even to decide to carry out a suggested plan. Earlier drill has fused all into a single unit responsive to any signal or command and capable of adjusting the acts of each to those of all the others. Fire-drills and all similar training of masses to respond to anticipated signals rob the critical moments of the uncertain, hesitating, and even contradictory movements which constitute such a large part of the disturbing emotion, and the actual danger in great accidents. Frequent repetition makes possible calm, effective action in almost any emergency. The fully prepared man has a habit ready for each situation, a response for each stimulus. Few men have such comprehensive habits, but each has habits which adapt him to his own profession and to the general demands of life. One can frequently determine the profession to which an individual belongs by observation of his habits. Much of the action that we call moral is determined in the last analysis by habit. The honest man does not think whether he shall or shall not return a purse that he finds. The honest act is a matter of course. Habits also distinguish the individual as well-bred or ill-bred. The boor cannot acquire good manners from reading or from personal directions. Only slowly acquired habits can work the change and these must ordinarily be acquired early in life.

For an explanation of habit we must turn to the nervous system. Before knowledge of the nervous system was so fully developed analogies for habit were found in many simple physical and biological phenomena. Change in tendencies as a result of action characterizes practically all things, particularly animate beings. Streams change their channels when some trickle finds a new course; "as the twig is bent so the tree is inclined"; a scar once formed will persist through all the changes in tissue due to new growth. In this metaphorical sense habit is a universal law of nature. Now we place the permanent effects of learning upon which habit depends in the nervous system. In simplest terms all action of a higher animal is due to a nervous impulse which starts in some sensory stimulation and finds its way through the nervous system to some muscle. The nervous units that intervene are simple living cells or neurones each with two processes extending in opposite directions. One of the filaments of a sensory neurone extends to a sense organ, the other inward to come into contact with other neurones. The last unit in the link has a process extending to a muscle. In the simplest case a filament of a sensory neurone may come into contact with a filament from a motor neurone and an impulse pass from one directly to the other and produce the movement. Usually if not always the sensory neurone is in contact with several motor neurones and in that case the impulse will pass to the motor neurone which is least separated from it, at the point of contact which offers the least resistance. Certain of these points of connection offer little resistance at birth and the reflexes or first acts will follow that path. After birth new connections are constantly formed and old connections come through use to offer a diminished resistance. It is this opening of new pathways that constitutes the formation of habits. In all more complicated acts more than two neurones are involved but that does not change the principle. Habits are formed when the connections between the sensory and motor neurones have been developed. It is at the points of connection between neurones that the action wears a path, in terms of the older metaphorical connections. As a result of frequent use the sensory stimulus that has become associated with the movement will always call out that movement.

In the formation of the habits the first movements are tentative and apparently succeed only by chance. The child and animal both learn to make the first movement by a process of trial and error. The impulse from the sensory impression may be pictured as spreading more or less at random through the nervous system, and calling out one response after another. The movements that are not successful or do not give pleasant responses are not repeated, those which are successful are repeated until the habit is formed and the given situation always excites the same movement. After the separate movements have been learned so that they can be made consciously they may be combined into larger units by habits. There is some trial and error in learning to combine them at this stage. The boy makes many false starts when he first attempts to tie a cravat and the whole requires much time and constant care. With repetition less and less thought is required until in the adult the whole operation is carried out without effort and finally even without awareness of the separate movements. In the continuous or compound act one element of the movement is excited by the sensations that come from the preceding element. In walking, the stimulus to one movement comes from the preceding movement; in tying the cravat completion of one movement arouses the next. When hesitation comes and the sensation from one movement is lost before the next starts, one must go back to the beginning before the following one can be made. In the final automatic stage thinking of what is to be done is a hindrance rather than a help as it emphasizes impressions and ideas that are not necessary to start the movements. After one movement has been learned or has become habitual it is linked with others to constitute a larger whole. Where at first a number of stimuli or acts of consciousness are needed to start the separate later elements one will evoke an entire series. A man starts to dress and one garment after another is put on without thought. One cue is sufficient to carry out the whole process. This leaves the man free to attend to other matters. Sometimes a wrong element will be introduced by habit. The absent-minded man may undress and go to bed when he starts to dress for dinner, but mistakes of this sort are sufficiently infrequent to make habit an advantage rather than a hindrance — in fact habit is indispensable.

Granted the supreme importance of habit for the individual and for society it is essential that right rules be followed to develop suitable habits. First, one must appreciate the immense importance of habit, that every act leaves its mark upon the nervous system, and that these marks in the long run make the man. When a habit is recognized as good every occasion possible should be utilized for executing the acts that are to make the habit. Especially is it necessary that no exception be permitted, no set of circumstances that demand the act should be allowed to pass without its performance. Each time a partly established habit is permitted to lapse,— each time some other response is made when it should have been,— the habit is weakened. In actions that are likely to prove valuable in moments of stress it is well according to James to make an effort to do the disagreeable at times to keep alive the capacity for doing the unpleasant when it shall be necessary. Little acts of self-denial are recommended to maintain the moral tone, just as a little unnecessary exercise is needed to keep the muscles of the sedentary worker ready for an emergency and to maintain the physical health. In general it is important for all development to choose good habits and to check the bad. Gradually through repetition a stock of habits will be acquired that constitute a large part of what is ordinarily regarded as the man and will determine his manners, his morals, as well as his efficiency. Consult Carpenter, William Benjamin, ‹Mental Physiology› (Chap. VIII, 1874); James, William, ‹Habit,› also ‹Principles of Psychology› (Vol. I, chap. iv, New York 1890); Hering, Ewald, ‹On Memory› (4th ed., 1913).

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HACHETTE, ą'shĕt, **Jean Nicholas Pierre,** French mathematician: b. Mézières, 6 May 1769; d. Paris, 16 Jan. 1834. He was educated at Charleville and at Rheims and became draughtsman in the school of engineering at Mézières in 1788. He subsequently taught hydrography at the College of Collioure and Port Vendre. In 1794 he became professor of descriptive geometry at the newly founded École Polytechnique, where he taught until 1816, when he was removed for political reasons. He was professor at the École Normale until his death. Hachette's election to the Royal Society was delayed until after the Revolution (1831). His researches in descriptive geometry in its practical applications have had an important effect on the development of French mechanical efficiency. His works include ‹Deux Suppléments à la géometrie descriptive de monge› (1811 and 1818); ‹Traité élémentaire des machines› (1809 and 1828); ‹Programme d'un cours de physique› (1809); ‹Eléments de géométrie à trois dimensions› (1817); ‹Applications de géométrie descriptive› (1817); ‹Correspondence sur l'Ecole Polytechnique› (1804–15). His publications in the leading scientific periodicals are numerous. For a bibliography of his publications consult ‹Catalogue of Scientific Papers of the Royal Society of London› (Vol. III, London 1869); and also Arago, F., ‹Oeuvres› (Vol. III, Paris 1855) and Silvestre, ‹Notice sur J. N. P. Hachette› (Bruxelles 1836).

HACHETTE, Jeanne Lainé, French heroine: b. about 1454. Her origin remains in obscurity. She seems, however, to have been the daughter of an army officer named Fourquet. Her fame rests on one incident of her life which was marked by distinguished heroism. Charles the Bold of Burgundy invaded France in 1472, and laid siege to Beauvais. After several unsuccessful attempts, one of the besieging army climbed the ramparts and planted the Burgundian flag there. Jeanne Lainé rushed up behind him and felled him with a blow of her hatchet. The courage of the assailants was considerably dampened and because of the delay caused thereby the city of Beauvais received reinforcements and was saved. The king of France, Louis XI, rewarded Jeanne by marrying her to the man of her choice, Colin Pilon, and by exempting her and her descendants from taxes, and granting the people of the town numerous other favors. He also established the annual ‹Procession of the Assault› in which the women of Beauvais march on Saint Angadrême's day, bearing the flag captured by Jeanne. In 1651 a statue was erected to the memory of Jeanne at Beauvais. Consult Vallat, ‹Jeanne Hachette› (Abbeville 1898).

HACHETTE, Louis Christophe François, French publisher: b. Rethel, Ardennes, 5 May 1800; d. 31 July 1864. Intending to prepare himself for the profession of teaching, he attended a normal school; but after three years' study, he was dismissed because of political reasons, and then undertook the study of law in 1822. Four years later, he entered the publishing business, establishing a house for the publication of works to improve the education and culture of his country. He soon gained a world-wide reputation for the splendid character and fine quality of his editions. They include the various French and ancient classics, dictionaries, scientific works, reference libraries, guidebooks, etc. He also founded the weekly *Journal pour Tous* in 1855, which soon gained a wide popularity. Hachette was also known for his social service work and his advocacy of the international literary copyright.

HACHIOJI, hä'chē-ō'jē, Japan, town on the island of Nippon, 23 miles from Tokio, with which it is connected by rail. Silk manufacture is the most important industry. Pop. 35,000.

HACKBERRY, American trees of the elm family and genus *Celtis,* growing in dry or wet woods throughout the eastern and southern United States and Canada and southward to Mexico. They are small or middle-sized, with the aspect of an elm. The fruit (a globular drupe) is sweet and edible, as large as the bird-cherry, and ripening in autumn. Several species are known. The trees are sometimes referred to as sugar-berry or nettle-tree. The soft, coarse-grained yellow wood is of little value. They are affected by the same insects that injure the elm (q.v.).

HÄCKEL, Ernst H. See HAECKEL.

HACKENSACK, N. J., city and county-seat of Bergen County, on the Hackensack River, and on the New York, Susquehanna and Western, and Erie railroads, 16 miles from New York. It is a residential city, but has brick, silk, jewelry, wall paper and other manufacturing interests. It has a public library, high school, hospital, gas and electric light, waterworks, electric street railways connecting with surrounding towns and cities and with New York, and an assessed property valuation of over $5,000,000. Hackensack was settled by the Dutch about 1640, and in 1678, a Huguenot settlement was established nearby, and during the Revolution was occupied in turn by the British and American armies. It was incorporated in 1868. The government is administered by a board of commissioners elected for three years. Pop. 16,011.

HACKER, Arthur, English artist: b. London, 25 Sept. 1858. He studied at Saint John's College, London, was a pupil in art of the Royal Academy and of Léon Bonnet at Paris (1880–81), was elected a royal academician in 1910, and has painted, besides many portraits, 'Pelagia and Philammon'; 'By the Waters of Babylon'; 'Christ and the Magdalen'; 'Annunciation'; 'The Cloud'; 'Studies of London.'

HACKER, Francis, English Puritan soldier: d. 1660. During the Civil War in England, he supported Cromwell, and was the officer in charge of the execution of King Charles I. His name was affixed to the executioner's order. In the Scottish War, he also supported Cromwell, and in the Cromwellian Parliament held office for Leicestershire. With the overthrow of Cromwell, Hacker was condemned by the royalist party and was hanged 19 Oct. 1660.

HACKETT, Horatio Balch, American Baptist clergyman and educator: b. Salisbury, Mass., 27 Dec. 1808; d. Rochester, N. Y., 2 Nov. 1875. He was professor of biblical literature at Newton (Mass.) Theological Seminary 1839–70, and of Greek at Rochester Theological Seminary, from the latter date. He was one of the committee of New Testament revision, and with Ezra Abbot (q.v.) edited the American edition of Smith's 'Bible Dictionary' (1868–70). His chief work was a 'Commentary on Acts' (1851); and he also wrote 'Memorials of Christian Men in the War' (1864); 'Tour in the Holy Land' (1866), etc.

HACKETT, James Henry, American actor: b. New York, 15 March 1800; d. Jamaica, L. I., 28 Dec. 1871. He went on the stage in 1826 and was particularly successful in impersonating Yankees and Westerners, but was best known by his Falstaff, which he played first about 1832. He was widely popular in the United States as well as in England. He managed several theatres at different times and acquired a fortune. He published 'Notes and Comments on Shakespeare' (1863). Consult Ireland, 'Actors and Actresses of Great Britain and the United States' (New York 1886).

HACKETT, James Keteltas, American actor: b. Wolfe Island, Ontario, Canada, 6 Sept. 1869. He is the son of J. H. Hackett (q.v.). He was graduated from the College of the City of New York in 1891, made his début in 1892, became leading man of the Lyceum, New York, in 1896, and appeared in 'The Prisoner of Zenda,' 'Rupert of Hentzau,' 'The Pride of Jennico,' 'Don Cæsar's Return' and 'The Crisis.'

HACKETTSTOWN, N. J., town in Warren County, on the Musconetcong River and on the Delaware, Lackawanna and Western Railroad and the Morris Canal, about 59 miles from New York city and 50 miles west of Newark. It is about 800 feet above the sea and within half a mile of the highest point in the State. Its chief manufactures are silk goods, embroidery, leather, carriages and wagons, and agricultural implements. The waterworks are owned and operated by the town and the supply comes from springs on Schooley's Mountain, distant from the town about two and one-half miles. It is the seat of the Centenary Collegiate Institute, under the auspices of the Methodist Episcopal Conference of Newark. It contains a public library, and a State fish hatchery is located here. Pop. 2,715.

HÄCKLANDER, Friedrich Wilhelm von, frĕd'-rĭh vil'hĕlm fōn häk'lĕn-dĕr, German novelist and writer of comedies: b. Burtscheid, near Aix-la-Chapelle, Prussia, 1 Nov. 1816; d. Leoni, near Munich, 6 July 1877. After serving for a time in the Prussian artillery he began a literary career with 'Pictures of Soldier Life' (1841), followed by 'Soldier Life in Peace' (1844). Other works of this period were 'Daguerreotypes' (1842); and 'Pilgrimage to Mecca.' In 1849 he went to Italy, where he was present with Radetzky's army during the campaign in Piedmont, and afterward published 'Soldier Life in War' (1849–50). Among the best of his longer novels are 'Trade and Traffic'; 'Eugene Stillfried' (1852); and 'Anonymous Histories' (1851). His best comedies are the 'Secret Agent' (1850), translated into several European languages, and 'Magnetic Cures' (1851). With Zoller, in 1885, he started the illustrated weekly *Over Land and Sea.*

HACKLEY, Charles Henry, American capitalist: b. Michigan City, Ind., 3 Jan. 1837; d. Muskegon, Mich., 10 Feb. 1905. In 1856 he went to Muskegon, Mich., and worked in a lumber-mill as laborer and foreman; then attended a commercial school and was given a position as bookkeeper and later came to be partner with a mill firm. In 1880 he founded the firm of which he was the head and which became one of the most important in the State; he was also interested in many other industries. He was a member of the board of education and was elected regent of the University of Michigan, but declined the office. He made large gifts to the city of Muskegon. In 1888 he gave a public library, which he endowed in 1891; in 1889 he had a park made in a central part of the city in which he erected a soldiers' and sailors' monument and other statues; in 1891 he built and endowed a manual training school; in 1901 he provided for the erection of a hospital with a training school for nurses, and erected a statue of McKinley, the first statue of the late President to be unveiled. The total value of his gifts was $1,389,525.

HACKMANN, Heinrich Friedrich, German Oriental scholar: b. Osnabruck, 1864. After studying at Leipzig and Göttingen, he lectured at Göttingen (1890–94), became pastor of a German church at Shanghai (1894–1901) and spent several years in Asiatic travel. He then became pastor of the Denmark Hill Church, London (1904–10), and for the next three years was engaged in missionary work in Asia. On his return in 1913, he became professor of the history of religion at the University of Amsterdam. He published 'Von Omi bis Bhamo' (1905; 2d ed., 1907); 'Missionsarbeit in China einst und jetzt' (1906); 'Buddhismus' (1905; Eng. trans. 1910); 'Welt des Ostens' (1912), translated into English as 'A German Scholar in the East' (1914).

HACKMATACK, hăk'mạ-tăk, the American larch. See LARCH.

HACKNEY, England, a metropolitan and parliamentary borough in the northeast of London, three miles north-northeast of Saint Paul's. Area, 3,288 acres. It has a fine modern town hall. Hackney was formerly noted for its boarding-schools for young ladies. It has manufactories of chemicals, india rubber, etc.; and had formerly extensive silk-mills. The borough returns three members to Parliament. Pop. 222,533. Consult Robinson, 'History and Antiquities of Hackney' (1842).

HACKNEY CARRIAGE or **COACH,** a four-wheeled enclosed vehicle drawn by two horses and seating four persons exclusive of the driver. They are usually let out for hire. The carriage derives its name from Hackney (q.v.).

HADAD, the name of an ancient Syrian deity, and also of several persons in the Old Testament. The divinity to whom it is applied is the storm god, known also as Ramman, Bir and Dadda. The «Adad» of Babylonia and Assyria has been identified with this god. The name is also found in compounds, such as Hadad Rimmon, Hadadezer and Ben Hadad (son of Hadad), the name assumed by various Syrian kings.

HADAMARD, ȧ'dȧ'mär', **Jacques Salomon,** French mathematician: b. Versailles 1865. In 1892 he received his doctorate from the École Normale, and five years later became professor at Bordeaux. He subsequently was professor at the Collège de France and the École Polytechnique. His principal contributions to mathematics have been in the study of the theory of numbers, the theory of functions, the integration of differential equations of mathematics and physics and on functional calculus. Beside numerous articles in scientific magazines, he has published 'Leçons de géométrie élémentaire' (2 vols., 1898–1901); 'Leçons sur la propagation des ondes et les equations de l'hydrodynamique' (1903); 'Leçons sur le calcul des variations' (1910).

HADDINGTON, Scotland, royal and municipal burg and county-seat of Haddingtonshire. It is situated on the Tyne, 18 miles east of Edinburgh with which it is connected by the North British Railway. The chief points of interest are the birthplace of John Knox; the chapel of Saint Martin; Saint Mary's Church, dating from the 13th century, which contains a memorial to Jane Baillie Welsh, the wife of Carlyle; the fine county buildings, town hall and Knox Memorial Institute. Haddington is the birthplace of King Alexander II (1198); John Brown, a dissenting divine (1722–87), Samuel Smiles, Edward Irving and Jane Baillie Welsh.

The principal industries are the manufacture of woolens, beer, leather and agricultural implements. Its grain markets are extensive, ranking second in Scotland. Haddington became a royal burg in the 11th century and it has received charters from succeeding kings. It was destroyed by fire in 1216 and again in 1244, and was later the scene of numerous struggles with the French. The neighborhood is rich in historic associations. Pop. 4,200.

HADDINGTONSHIRE, or **EAST LOTHIAN,** Scotland, a county in the southeastern part, bounded on the north by the Firth of Forth, on the northeast by the North Sea, on the east and south by Berwickshire and on the west by Edinburghshire. It covers an area of 281 square miles and has a sea coast of 41 miles. The chief river is the Tyne, which traverses the county in a northeasterly direction, emptying into the sea at Tyningham. It is a rich grain district and raises other agricultural products extensively also. Forests cover about one-sixteenth of the area. Other industries are coal mining, stone quarrying and manufactures of farm implements and woolens and brewing. The capital is Haddington (q.v.); other important towns are Dunbar, North Berwick and Prestonpans. Haddingtonshire was settled originally by the Celts, and became part of Scotland in 1018, under Malcom II. Pop. 42,939.

HADDOCK, a fish (*Melanogrammus æglefinus*) of the same family (*Gadidæ*) as the cod and much resembling it in general appearance. From the cod it may be easily distinguished by the black lateral line and suprapectoral blotches and the swollen bones of the shoulder girdle. The haddock scarcely exceeds a weight of 15 pounds, and is usually about three or four pounds. It is restricted in its range to the north Atlantic. The food is extremely varied, consisting of every kind of bottom-living invertebrate. Spawning occurs in late winter and early spring, according to locality, and the eggs are essentially like those of the cod. Haddock associate with cod on the Banks, but the principal American fisheries are in Massachusetts Bay, on the Nantucket shoals and other points off southeastern New England, where immense numbers are taken on trawl and hand lines, especially during the summer. Philadelphia and Boston furnish the best markets for fresh haddock, but the demand from the interior is constantly growing. Though considerable quantities are salted at Provincetown, the haddock when so prepared is much inferior to the cod. The Scotch method of drying and smoking produces the much superior "Finnan Haddies" and is largely practised at Portland and Boston.

HADDON, Alfred Cort, English ethnologist: b. London, 24 May 1855. After studying at Christ College, Cambridge, he became in 1880 professor of zoology in the Dublin Royal College of Science, where he remained until 1901. In that year he became Fellow at Christ College. From 1900–09 he was Cambridge lecturer in ethnology, and from 1904–09 lectured on the same subject at the University of London. He is a member of various ethnological and antiquarian societies. Among his publications are 'Introduction to Embryology'; 'Evolution in Art' (1895); 'Study of Man' (1897); 'Head Hunters, Black, White and Brown' (1901); 'Magic and Fetishism' (1906); 'The Races of Man and their Distribution' (1909); 'History of Anthropology' (1910), with Quiggin; 'The Wanderings of Peoples' (1912).

HADDON HALL, an old English baronial mansion, the seat successively of Avenells, Vernons and the Rutland family, stands on a slope overlooking the Wye in Derbyshire, 23 miles north-northwest of Derby. The styles of architecture range from Norman to the 16th century. Reference is made to it in Scott's 'Peveril of the Peak.' Although it is not inhabited it is in fine condition and remarkable as one of the most interesting extant examples of the country house of a great landowner in the late Middle Ages.

HADDONFIELD, N. J., borough of Camden County, five miles southeast of Camden, on the West Jersey and Seashore Railroad. Bancroft Training School and the Shepherd's Home are located here, and contains a public library, Hopkins Park and Lake. It is a popular residential suburb of Philadelphia. Its industries are mainly agricultural; and it has also manufactures of stoves, tinware, pottery, watchcases, etc. The commission form of government was inaugurated in 1913. Pop. 4,142.

HADE. See FAULT.

HADEN, SIR Francis Seymour, English etcher and surgeon: b. London, 16 Sept. 1818; d. Woodcote Manor, Hampshire, 1 June 1910. He studied at the Sorbonne and in the Paris and Grenoble medical schools and practised as a surgeon from 1847 to 1887. The 'Etched Work of F. S. Haden' contains 185 plates by him and still others have been published in 'Etudes à l'Eau Forte' (1865–66). His work as an etcher is noted for both vigor and breadth. He was president of the Society of Painter Etchers, was knighted in 1894 and wrote 'Etched Work of Rembrandt' (1879–80); 'About Etching' (1881).

HADES, hā'dēz, the Greek name of a god, in large measure corresponding to the Roman Pluto, who reigned over the infernal regions. Both Greeks and Romans supposed the infernal regions to be in the centre of the earth. To enter these, the river Styx had to be crossed by the dead in the wherry of Charon. If, by any chance, the body lay unburied, the shade was detained 100 years on the bank of the Styx before crossing. The Greek word Hades is rendered in the authorized version by the ambiguous term hell (q.v). Expressions, most of them obviously figurative, used of Hades, represent it as subterranean; as having gates with keys in the hand of Christ, and as having, in a portion of it, souls in torment.

HADIS, or in Arabic plural, AHADIS, narratives or traditions, which relate to the Prophet Mohammed, and are not found in the Koran. There are numerous collections of these floating traditions, anecdotes and legends. A search for such data was first undertaken by Abdul Malik ibn Juraisch (d. 722 A.D.). Others consider that the collection of Imam Malik (d. 801) is the earliest extant. The following six Hadis collections are considered by the Sunnite Moslems to be canonical scriptures: 1. The Hadis of Mohammed Ismail al Buchari (d. 878). 2. Of Muslim ibn ul Hajaj (d. 883). 3. Of Abu Isa Mohammed al Tirmisi (d. 901). 4. Abu Daud al Sajistani (d. 897). 5. Of Abu Abd ur Rahmân al Nasâi (d. 925). 6. Of Abu Abdallah Mohammed Ibn Wajah (d. 895), None of these have ever been printed.

HADLEY, Arthur Twining, American college president: b. New Haven, Conn., 23 April 1856. A son of James Hadley (q.v.), he was graduated from Yale in 1876, and took graduate studies in political science at Yale and the University of Berlin. In 1879–83 he was a tutor at Yale, and during that time wrote for several journals, including the *Railway Gazette* and the *Financial Chronicle*. He was commissioner of labor statistics for Connecticut (1885–87), and was in 1885 a witness before the Cullom State committee which prepared the Interstate Commerce Law. In 1886 he became professor of political science at Yale, and in 1899 was made president of the university. He was president of the American Economic Association for two years. In 1885 he published 'Railroad Transportation: Its History and Laws,' which is everywhere recognized as one of the chief authorities on the subject and has been translated into French and Russian; his other works include 'Report on the Labor Question' (1885); 'Economics, an Account of the Relations between Private Property and Public Welfare' (1896), presenting the theories of political economy in accordance with the most modern research and thought; 'The Education of the American Citizen' (1901); 'Freedom and Responsibility' (1903); 'Baccalaureate Addresses' (1907); 'Standards of Public Morality' (1907); 'Some Influences in Modern Philosophic Thought' (1913); 'Undercurrents in American Politics' (1915). He also acted as chairman of the Railroad Securities Commission, which was appointed under the Act of Congress of June 1910 and published its 'Report' in 1911. In all his books he has endeavored to utilize the results of economic and political history as a basis for a working system of ethics.

for a democracy like that of the United States. His writings show him to be not only a scholar, but also a man of affairs well acquainted with the business world, and in this regard he is one of the best representatives of the modern type of university presidents.

HADLEY, Henry K., American composer: b. Somerville, Mass., 1871. He was a pupil of S. A. Emery and G. W. Chadwick in Boston, studied also in Vienna, and in 1895 returned to the United States and was appointed instructor in music at Saint Paul's School, Garden City, L. I. His symphony, ‘The Four Seasons,’ received the prizes given by the Paderewski Fund and the New England Conservatory of Boston. His works further include a rhapsody for orchestra, ‘The Culprit Fay,’ which won the prize offered by the National Federation of Musical Clubs; two symphonic poems, ‘Salome’ and ‘Lucifer’; three symphonies; three overtures; a cantata; two serious operas, ‘Safie,’ produced in Mayence, and ‘Izora, Daughter of Montezuma’; four comic operettas, a string quartette and 150 songs and piano compositions and church music complete the list. From 1907 to 1909 he was Kapellmeister in the opera house in Mayence. During these years he conducted his works in the principal cities of Europe. In 1909 he accepted the position of conductor of the Seattle Symphony Orchestra, and in 1911 became conductor of the San Francisco Symphony, which position he held for four seasons. During the years since his return to America he has conducted his own works in Chicago, Boston, New York, London and Philadelphia. In 1912 he wrote the music for ‘The Atonement of Pan.’

HADLEY, James, American philologist: b. Fairfield, N. Y., 30 March 1821; d. New Haven, Conn., 14 Nov. 1872. When a boy he suffered an injury to his knee, which developed seriously and crippled him for life. He was graduated from Yale in 1842, took graduate studies in mathematics and also a theological course. In 1844 he was tutor at Middlebury College, Vermont, and in 1845 became a tutor at Yale. In 1848 he became assistant professor of Greek there, and in 1851 professor of Greek. He was familiar not only with Greek, Latin and the chief modern languages, but also with Hebrew, Arabic, Armenian, Gaelic, Irish, Sanskrit, Gothic and Old English, and won a high reputation as a linguist distinguished for exactness and thoroughness in detail, united with breadth of view; he also was successful and influential as a teacher. He published a ‘Greek Grammar’ (1861), based on Curtius, and wrote the «Brief History of the English Language» in the 1864 edition of Webster's ‘Dictionary’; after his death, his ‘Introduction to Roman Law’ (1873) and ‘Philological and Critical Essays’ (1873) were published.

HADLEY, John, English mathematician and astronomer: b. 1682; d. 14 Feb. 1743. He became a Fellow of the Royal Society in 1717, and was the inventor of Hadley's quadrant (see Sextant) and of a reflecting telescope (1723). The credit of having invented the sextant is claimed for Hadley, Godfrey and Newton, but each seems, nevertheless, to have made his own discovery independently. Hadley described his instrument, which he called an «octant,» to the Royal Society in May 1731.

HADLEY, Mass., town, which includes several villages, in Hampshire County, on the Connecticut River and on the Boston and Maine Railroad, three miles northeast of Northampton and four miles southwest of Amherst. It was settled in 1659, and was first called Norwottack; but in 1661, when it was incorporated, it was given the name Hadley, from Hadley in England. William Goffe and his father-in-law, Whalley, who fled from England to America in 1660, and who lived for a time near New Haven, sought concealment in Hadley, in 1664, where Goffe died in 1679. According to tradition, when Hadley was at one time attacked by Indians and the people were called from the meeting-house, they stood helpless until Goffe, appearing, took the lead and repelled the enemy. Hadley is an agricultural region, and its industries are chiefly connected with farm products. Brooms and broom tools are manufactured and there are two public libraries. The town is governed by annual meetings of the citizens. Pop. 1,999. Consult Judd, ‘History of Hadley’ (Northampton 1905).

HADRAMAUT, hä-drä-mât', Arabia, the name given to the coast region from Aden to Cape Ras-al-Hadd. It consists of a plateau, parted from a mountain chain, the barrier of the interior desert, by a complex of valleys. Area, 100,000 square miles. Commerce, agriculture, cattle-breeding and the chase are the chief occupations. The climate is dry but healthy. Pop. 500,000.

HADRIAN, ha'drĭ-an (Publius Ælius Hadrianus), Roman emperor: b. Rome, 24 Jan. 76; d. Baiæ, 10 July 138. For his ardor in the study of Greek he earned the nickname of Græculus. A nephew of Trajan, he was adopted by that emperor, fought under him against the Dacians with some glory, and having been entrusted with the prefecture of the East and the command of the Roman armies in the East early in 117 when Trajan left the field, Hadrian, upon Trajan's death later in the same year, was made emperor by his soldiers. He quickly realized that he could make no forcible head against the simultaneous attacks of the Parthians and, in Dacia and Moesia, of barbarian foes, to say nothing of revolt in Syria and Egypt. With the true insight of a diplomat he foresaw that the extreme East must be either surrendered voluntarily or lost and chose the former alternative as the least costly. Hence he gave up Armenia, Mesopotamia and Assyria, all comparatively new Roman provinces, to the Parthian power, and withdrew the Roman eagles to the west of the Euphrates. In 119, for the purpose of becoming acquainted with the state of the provinces, he began his celebrated journey, which he is said to have performed chiefly on foot, marching bareheaded 20 miles a day and sharing cheerfully the hard fare of the humblest soldier. He visited Gaul, Germany, Britain — where he built the famous wall extending from the Solway to the Tyne — Spain, Mauritania, Egypt, Asia Minor and Greece, whence he returned to Rome after his circuit of the empire in 126 to 127 a.d., and received the title of «Pater Patriæ.» Hadrian spent the years 132 and 133 in Athens, which city he adorned with splendid and costly buildings. After once more visiting Syria and crushing a desperate Jewish revolt, he returned to

Italy and spent the last years of his life at Rome and his villa. During his reign the army was vigorously disciplined and reorganized. As a civil ruler he merits high praise for the just and comprehensive view he appears to have taken of his duties as a sovereign. Hence to him is attributed, more than to any other, the consolidation of the monarchical system of Rome. Hadrian also divided Italy into four parts under four consuls, to whom was entrusted the administration of justice. Hadrian had a passion for building: his most splendid edifices were a famous villa at Tibur (now Tivoli), and in Rome the Aelian bridge, built in 136 and now styled the Pont Sant' Angelo. This bridge leads to the emperor's splendid mausoleum, the Moles Hadriani. He likewise laid the foundation of several cities, the most important of which was Adrianopolis. He was a lover of the fine arts and set a high value on Greek literature. No fragment of ancient literature has been more famous than the verses attributed to the dying Hadrian:

Animula vagula, blandula
Hospes comesque corporis
Quæ nunc abibis in loca
Pallidula, rigida, nudula,
Nec ut soles dabis jocos?

David Johnston, in his 'Translations, Literal and Free, of the Dying Hadrian's Address to his Soul' (1877), gives no fewer than 116 translations of all degrees of excellence. Among well-known writers, Byron, Prior, Pope and Merivale have attempted renderings. Consult Gregorovius, 'Der Kaiser Hadrian' (1884; Eng. trans., 1898); Durr, 'Die Reisen des Kaisers Hadrian' (1884); and 'The Life of the Emperor Hadrian,' by Spartianus (1908).

HADRIAN'S WALL, a wall in the north of England, between Solway and the Tyne, called also the Roman Wall and the Wall of Severus. Before Agricola advanced into Scotland he established forts between the estuary of the Tyne and the Solway Firth, to protect him from attack in his rear. He adopted the same precaution before leaving the Lowlands of Scotland for the Highlands, placing encampments between the firths of Forth and Clyde. Afterward walls were constructed on these two lines. On the English side of the Border is a stone wall with a ditch on its north side. Attached to it are stationary camps, mile-castles and turrets for the accommodation of the soldiery who manned it. To the south of the stone wall is a series of ramparts generally called the *vallum*. This fortification consists of three aggers or mounds and a ditch. The military way along which the soldiery moved lies between the *murus* or stone wall and the vallum. The wall was not intended as a mere fence to block out the Caledonians, but as a line of military strategy. Hadrian is now generally believed to have been the builder of the whole structure. Severus, however, repaired it before he advanced into Scotland. Agricola came to Britain in 78 A.D. Hadrian came toward the close of 119 A.D. Severus died in 211 A.D. Considerable portions of Hadrian's Wall yet remain. In two places the wall stands nine feet high. Consult Bruce, Collingwood, 'The Roman Wall' (1851); and 'Handbook to the Roman Wall' (1863); Neilson, 'Per Lineam Valli' (1891); and 'An Account of the Roman Antiquities Preserved in the Museum at Chesters, Northumberland' (1903).

HADROSAURUS, hăd-rō-sâ'rŭs, or **TRACHODON**, a genus of duck-billed dinosaurs of the Cretaceous rocks of North America. Compare CLAOSAURUS.

HAECKEL, hĕk'ĕl, **Ernst**, German zoologist: b. Potsdam, 16 Feb. 1834. After the usual gymnasium course, he at first devoted himself to botany at the University of Berlin, but owing to his father's wishes took up the study of medicine at Würzburg, where he enjoyed the guidance of Virchow and Kölliker. Returning to Berlin in 1854, he took courses with the great physiologist Johannes Müller, who exerted a lasting influence on him and turned his attention to zoology, and after several additional semesters at Würzburg, he received the degree of M.D. in Berlin in 1857. After a very brief attempt at practising medicine he definitely abandoned this profession for zoology and during a study trip to Messina laid the foundation of his scientific career by an intensive investigation of radiolaria. In 1861 he obtained permission to lecture at the University of Jena and was soon appointed assistant professor of zoology. A monograph on the radiolaria published the following year established his professional reputation. It was here that Haeckel first clearly expressed his advocacy of Darwinian principles, of which he henceforth became the most ardent defender among German scientists. In the beginning his championship found expression in a two-volume work, 'Generelle Morphologie der Organismen,' which appeared in 1866 and has kept its place as one of the classics of philosophical zoology. Owing to the extremely technical character of this *chef-d'œuvre*, its immediate effect even upon specialists was slight. Two years later, accordingly, Haeckel summed up the essential elements of evolutionary philosophy in a more popular volume on 'Natürliche Schöpfungsgeschichte' (translated into English as 'History of Creation'). A corresponding work dealing specifically with the descent of man appeared in 1874 under the title 'Anthropogenie' (English translation 'Evolution of Man'). The frankly antitheological point of view assumed in these writings drew upon Haeckel the anathemas of the Church, while his daring hypotheses as to the development of animal types elicited the vigorous criticism of many sober colleagues and involved him in bitter controversies, notably with his one-time teacher and friend, Virchow (1877). On the other hand, his powerful personality won over new adherents to Darwinism and stimulated a host of young zoologists, of whom some, like Oskar Hertwig and Max Verworn, have attained world-wide fame. While Haeckel's popular books were being issued in ever-increasing editions, he continued his contributions to science by monographs on the medusæ, siphonophora, sponges and other low organisms, and elaborated a new monumental work on the radiolaria for the British *Challenger* expedition. These years of strenuous activity were diversified with excursions to Madeira, Egypt, Algeria, Ceylon and other remote regions. His technical labors ceased with the 'Systematische Phylogenie' (1894–96).

From this time on Haeckel stands forth exclusively as a leader of intellectual radicalism, seeking converts to his philosophy of "monism," which is designed to unify the most general teachings of science and take the place of religion in the world-view of modern man. The manifesto of this creed was published in 1899 under the title of 'Die Welträtsel' (English translation 'The Riddles of the Universe'). Its unexampled success led to many new editions and indicated how well adapted its tenets were to the aspirations of the free-thinking masses. The uncompromising rejection of a personal God, immortality and the freedom of the will again roused the hostility of conservative writers, while even philosophers free from theological bias were shocked by Haeckel's unacademic treatment of metaphysical problems. The charge of materialism often advanced in this connection is nevertheless only partly warranted. As Wundt points out, Haeckel's thinking often suggests Spinoza and Leibnitz, and it may be added is not without a mysticism of its own. As a supplement to 'The Riddles of the Universe' Haeckel wrote a volume on 'Die Lebenswunder' (English translation: 'The Miracles of Life'), which was issued in 1914. He continued to lecture and write popular essays on zoological and philosophical subjects and founded the Monists' League ("Monistenbund"), of which he is honorary president. On the occasion of his 80th birthday he received a title of nobility, having some years previously been made a Privy Councillor. The outbreak of the European War found him in the ranks of patriotic Germans, and his thoughts on the international situation were collected under the caption 'Eternity' (1916).

Among specialists Haeckel's reputation has suffered on account of his obstinacy, which for example led him to cling to the belief in the inheritance of acquired characters, and also from his excessive fondness for hypotheses. Nevertheless many of these have proved extremely fertile and promoted the development of modern zoology. Over and above the many special contributions which science owes him must be reckoned a great number of significant concepts which he first introduced into biological thinking. He was also an innovator in making experimental investigations in zoology, though he was unable to appreciate the later evolution of experimental methods. His essays in philosophy cannot be fairly judged from the metaphysician's level but must be understood as the strivings for a unified world-view of an unusually artistic temperament estranged from the traditional creeds. Haeckel's unique position in the history of modern thought lies in the extraordinary effectiveness of his propaganda as an apostle of intellectual liberalism. For biographical data consult Wilhelm Bölsche, 'Ernst Haeckel' (Leipzig 1900), and the two anniversary volumes 'Was wir Ernst Haeckel verdanken,' Heinrich Schmidt, editor (Leipzig 1914).

Robert H. Lowie,
American Museum of Natural History.

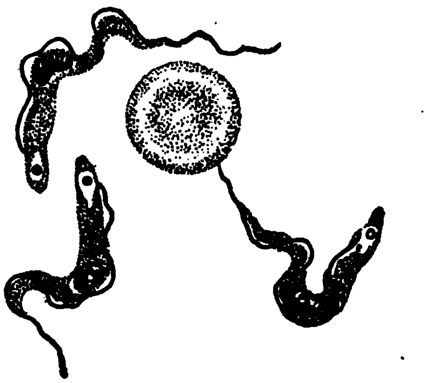
HÆMATEMESIS, hē-mạ-tĕm′ē-sĭs, vomiting blood from the stomach, or œsophagus. It may result from alcoholism, poisoning or cirrhosis of the liver. It is more frequent in later life than hemoptysis (q.v.) but may occur in the acute perforating ulcers of the stomach in young women. It is frequently associated with cancer, but it results also from external violence.

HÆMATIN, or HEMATIN. See Hæmoglobin.

HÆMATOXYLIN, hē-mạ-tŏx′ō-lĭn ($C_{16}H_{14}O_6$), the coloring matter of logwood, or *Hæmatoxylon Campechianum*, obtained from the extract by allowing it to stand some days in contact with ether, decanting, removing the ether, and adding water. Hæmatoxylin gradually deposits, and the crystals by pressure and recrystallization from water containing a little ammonium sulphite can be got nearly colorless. Combined with three molecules of water it forms dimetric, with one of water trimetric crystals. The crystals are large, transparent and brilliant, and have a sweet taste. Hæmatoxylin dissolves sparingly in water, but it is taken up very freely by solution of borax, by hypo-sulphite of sodium, phosphate of sodium and some other salts. It is also soluble in ether and in alcohol. By acids it is not readily affected, but it reacts at once with alkalis, forming colored solutions, and with metallic oxides forming precipitates of various colors. By joint action of air and bases hæmatoxylin is oxidized and becomes transformed into hæmatein.

HÆMATURIA. See Hematuria.

HÆMOFLAGELLATA, a goup of flagellata Protozoa parastic in the blood of vertebrates. The majority of these forms belong to the *Trypanosomatidæ*, or trypanosomes, which have come to be recognized as among the most serious disease-producing Protozoa. Evans in 1880 found them in horses in India afflicted with surra; Bruce in 1894 discovered another species to be the cause of nagaña in South African cattle and horses, and finally in 1898 Nepveu identified one in human blood. Rediscovered in 1901 in a European afflicted with intermittent fever, Dutton named it *Trypanosoma gambiense*, and a year later Castellani demonstrated its occurrence in sleeping sickness with which its causal relation has been abundantly demonstrated since then.



Trypanosoma gambiense from human blood, grouped around a single red corpuscle in the centre. (After Dutton).

The Trypanosoma is spindle-shaped, with one (in other species rarely two) terminal flagella and a lateral, undulating membrane, the thickened margin of which is continuous with the flagellum. The nucleus usually lies near the centre of the body; a smaller body, known as the kinetonucleus or blepharoplast lies at the root of the flagellum near the anterior end of the organism. The complex life cycle has only been partially elucidated; it involves alternation of hosts and probably also metagenesis. Transfer from one host to another is effected by a bloodsucking invertebrate, usually a fly. In the common species this is a Glossina or tse-tse fly, in which certain stages of the life history are completed. While generally dispersed by the circulatory system when introduced into the vertebrate host by the bite of the fly, these parasites are more abundant in the spleen, bone marrow and kidneys, in the capillaries of which multiplication proceeds most rapidly.

The effects on the vertebrate host are variable. In the natural or true host has been developed a tolerance that shows itself in the small number of trypanosomes present and in the absence of serious effects. On the other hand, in casual hosts which are not adapted to their attacks, serious effects follow the introduction of trypanosomes. In man and the domestic animals introduced into new regions they evoke destructive epidemics such as have carried off cattle in Africa, or horses and mules in the Philippines. The wide spread and terrible ravages of sleeping sickness in man in central Africa is a conspicuous illustration of the same phenomenon. In each case some native animal in which the parasite is unknown or unnoticed serves as the reservoir of the disease, from which it is transmitted to the new host by the attacks of biting flies also native to the region.

Henry B. Ward.

HÆMOGLOBIN. See Hemoglobin.

HÆMOPHILIA. See Hemophilia.

HÆMOPTYSIS. See Hemoptysis.

HÆMORRHOIDS. See Hemorrhoids.

HĀFIZ, Persia's greatest lyric poet and one of the renowned lyrists of the world: b. about 1325; d. about 1389. For nearly six centuries the Odes of Hāfiz have received universal acknowledgment as masterpieces in the lyric vein. Hāfiz was a native of southern Persia, having been born in the city of Shiraz about the year 1325 A.D. The same city had producd also his famous predecessor Sa'dī (q.v.), While the Persian name Hāfiz is really only a title meaning "gifted with a good memory," as bestowed upon him as a pupil who knew the whole Koran by heart, it has clung to him by fame instead of his real name which was in full Muhammad ad-Dīn, or "Mohammed, the Sun of Religion."

Gifts such as Hāfiz showed early in youth soon won literary patronage. Persian notables made him their friend and became also his benefactors. A theological institution was even founded in his honor with a professional chair for him to hold. The impression, however, seems to be well founded that his severance from this post was ultimately due to his freedom of thought and perhaps to a too liberal manner of life, together with his outspoken contempt for the hypocrisy that was characteristic of some of the Mohammedan priests of his time.

The poetic talents of Hāfiz could never have long waited for full recognition even outside of Persia. He received a princely invitation from one of the Bahmanid dynasty in India to grace his court in Hindustan. The story of the acceptance by Hāfiz, and of the fearful attack of seasickness which made him turn back from the journey, and of the graceful ode which he wrote to his would-be royal patron as an apology for not being able to fulfil the obligations of his acceptance, are facts recorded in connection with his life. The poetic career of Hāfiz is therefore wholly confined to Persia.

Hāfiz lived to a fairly ripe old age, and allusion is made in his lyric verses to sons born from his marriage. The date of his death is not altogether certain, but it appears to have been about the year 1389 A.D. In the environs of his beloved city of Shiraz lie his remains in an enclosed tomb that is still a place of pilgrimage, including visits as tributes from lovers of poetry in the West.

Estimates of Hāfiz and his Odes may be summarized somewhat as follows: The burden of his lyric verses is love and wine, the nightingale and the rose. Regarding the interpretation of these tender effusions, so full of passion, there is considerable difference of opinion, particularly in the Occident. Hāfiz is frequently spoken of as "the Persian Anacreon"; and there is no doubt that there is much that is anacreontic in his poetry. At the same time due weight must be given to the Oriental interpretation of the Odes of the Sūfī mystics as being symbolic and allegorical expressions of Divine Love couched in terms of human passion. On the whole it may be said that the interpretation which is probably nearest the truth is the one that holds the mean between these two extremes, esoteric and exoteric, in seeking to understand the poetry of so human and so ideal a master of lyric song as was Hāfiz. See Odes.

Bibliography.— The best available edition of the text of Hāfiz's poems is by H. Brockhaus (Leipzig 1854–56). The most valuable and complete translation, with commentary, is that by H. Wilberforce Clark, 'The Dīwān-i Hāfiz' (London 1891). There are translations of many of the odes in various languages, and Hāfiz has influenced the poets of many lands (cf. H. Ethé, 'Neupersische Litteratur,' pp. 303–305). Among English versions of selections may be mentioned those found in H. Bicknell, 'Hāfiz' (London 1875); S. Robinson, 'Persian Poetry for English Readers' (pp. 384–507, London 1883); J. H. McCarthy, 'Ghazals of Hāfiz' (New York 1893); Bell, 'Poems from the Divan of Hāfiz' (London 1897); W. Leaf, 'Versions from Ḥāfiz' (London 1898); and especially in the work of J. Payne, 'Hāfiz' (1901). On Hāfiz in general consult also I. Pizzi, 'Storia della poesia persiana' (I. 302–347, Turin 1894); P. Horn, 'Geschichte der persischen Litteratur' (pp. 114–122, Leipzig 1901); F. Veit, 'Platens Nachbildungen aus dem Diwan des Hāfiz' (Berlin 1908); and for a popular sketch of Hāfiz consult C. Field, 'Persian Literature' (pp. 213–229, London 1914).

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HAG-FISH, any of various eel-like creatures of the class of Cyclostomi (q.v.). They are eel-like in shape, lack all paired fins, have a suctorial mouth, without jaws; a single nostril at the tip of the head and either one (*Myxine*) or from 6 to 14 (*Polistotrema*) gill-openings along the sides of the body. Around the mouth are eight barbels, and the nostril connects with the cavity of the mouth. The skin contains numerous mucus-glands and also numerous pockets of «thread-cells,» the protoplasm of which is converted into long threads, which, when discharged, unwind and, together with the mucus, form a jelly-like mass protecting the animal. The eggs are large, oval in shape and enclosed in a horny case provided with hooks on each end by which they are anchored to sea weed, etc., on the bottom. Where abundant the hag-fishes are among the greatest pests of the fishermen. They attach themselves to other fishes in the neighborhood of the gills or on the eyes, and thence work themselves rapidly into the interior of the body, devouring the viscera, muscles, etc., so that there remains «a living hulk of head, skin and bones.» The California hag-fishes (*Polistotrema stouti*) will devour a fish of 10 or 15 pounds in a single night, and it is believed that they enter the fishes after they are taken in the nets. The hag-fish of the Eastern coast (*Myxine glutinosa*) ranges north of Cape Cod, and in the European seas, south to the English Channel. Other species occur in other parts of the world.

HAGAR, hā'gạr, an Egyptian handmaid in Abraham's house. She was presented by her mistress, Sarah, to Abraham, in order that Abraham might not die without descendants, Sarah herself being barren. Hagar bore Ishmael; but Sarah soon became jealous of her, and treated her severely. When Sarah bore Isaac, Hagar was sent away by Abraham, who, the Bible informs us, had received a divine order to dismiss her. She suffered much distress in the desert, but was relieved by an angel, and married her son to an Egyptian woman.

HAGEDORN, Hermann, American author: b. New York, 18 July 1882. He was graduated at Harvard in 1907, studied at the University of Berlin 1907–08 and at Columbia 1908–09. In 1909–11 he was instructor in English at Harvard. He has written several one-act plays produced by the Harvard Dramatic Club and at other colleges; also lyrics for Peterborough pageant 1910, and an adaptation of 'The Witch,' produced at the New Theatre, New York 1910. He has published 'The Silver Blade,' a play in verse (1907); 'The Woman of Corinth' (1908); 'A Troop of the Guard and Other Poems' (1909); 'The Horse Thieves,' one-act comedy (1909); 'Poems and Ballads' (1911); 'Faces in the Dawn,' a novel (1914); 'Makers of Madness,' a play (1914); 'The Heart of Youth and Other Poems' (1916); 'You are the Hope of the World' (1917), addressed to the boys and girls of America; 'The Boy's Life of Theodore Roosevelt' (1918); and a translation of Kleist's 'Prinz von Homburg' for 'German Classics of the 19th and 20th Centuries' (1913).

HAGEN, Gotthilf, gŏt'hĭlf hä'gĕn, German hydraulic engineer: b. Königsberg, Prussia, 3 March 1797; d. Berlin, 3 Feb. 1884. He studied at the University of Königsberg; in 1816 observed at Kulm the total eclipse of the sun, but later turned his attention from astronomy to engineering, and from 1831 to 1849 was professor of hydraulic engineering in the School of Engineering. The naval harbor of Wilhelmshafen, one of the strongest on the German Ocean, was built from his designs. In 1869 he became director of the Prussian building department. His most important work is his 'Handbuch der Wasserbaukunst' (1841–65), besides which he published numerous other volumes, including 'Die Kanalisierung der obern Saar' (1866), and 'Untersuchungen über die gleichförmige Bewegung des Wassers' (1876).

HAGEN, Theodor, tā'ō-dōr, German painter: b. Düsseldorf, 24 May 1842. He became known through his landscapes of the Eifel Mountains and Westphalia, in 1871 was appointed professor in the Weimar Art School, of which he was also director from 1877. In 1881 he resigned both posts and returned to Düsseldorf. He obtained a gold medal at the Berlin exposition of 1891. Among his works, distinguished by their forceful drawing and excellence of aerial perspective, are 'The Kanderthal in Switzerland'; 'Sunset in the Siegenthal'; 'Spring Weather'; 'Swiss Landscape, with the Saint Gothard Pass'; 'Town on the Lower Rhine — Evening'; 'The Fleet.'

HAGENBECK, hä'gĕn-bĕk, **Karl**, German zoologist and dealer in wild animals: b. Hamburg, 10 June 1844; d. there, 14 April 1913. His father, a fish dealer, commenced a trade in live animals about 1852, which he handed over to his son Karl in 1866. The latter developed the business to enormous dimensions, sending out great expeditions to Africa, India, Asia and South America to capture wild animals. Every year four or five vessels reached Hamburg laden with the spoils of the chase. From 1875 he began exhibiting collections of natives of little-known countries, together with their huts, domestic utensils and fauna. The first exhibit was a troupe of Laplanders with a herd of reindeer; then followed tribes of Nubians, Eskimos, etc., showing them all over Europe. He brought over 1,000 animals to the Chicago Exposition in 1893, and has since brought vast zoological concerns to London and Paris. He greatly improved the methods of capture and maintenance of animals, carefully studied their nature and needs, and was finally able to provide trained lions, tigers and elephants ready for menagerie performances. He introduced «happy family» groups of the most incongruous companions in one cage — polar bears, tigers, lions, dogs, cats, rabbits and mice, all living — or at least performing — together with a trainer in their midst. In 1902 Hagenbeck purchased a large piece of land at Stellingen, near Hamburg, where he built an animal park on entirely novel lines, eliminating cages and barriers by substituting impassable pits around the rocks, jungle or other habitats where the animals roam about in an apparently natural state. He also started an ostrich farm, and succeeded by degrees in acclimatizing this bird in the cold region of Hamburg. An ambitious plan commenced some years before his death was a life-like and life-size reproduction of prehistoric monsters, whose gigantic and hideous shapes may be seen to-day peacefully "browsing" in the artificial morasses and woodlands of the Tiergarten. Hagenbeck's sister, Christiane, has conducted (since 1873) an independent business in birds, handling some 50,000 heads annually. Like her brother, she also sends expeditions to Brazil, Madagascar and other parts for the capture of birds. Consult biographies of Hagenbeck by Leutemann (Leipzig 1887) and Fischer (1896).

HAGERSTOWN, Md., city and county-seat of Washington County, on Antietam Creek, and on the Baltimore and Ohio, the Cumberland Valley, the Norfolk and Western and the Western Maryland railroads. Here are extensive manufactures of knit goods, bicycles, machinery, steam engines, lumber, flour, silk, pipe organs, cigars, matches, furniture, automobiles, ice, fertilizer, spokes, bent wood, boilers, etc. It is the trade centre of western Maryland and contains a courthouse, high school, Bacon's School for boys and girls, Kee Mar College for women, the Washington County Free Library, a hospital, electric light and street railways, three national banks and an assessed property valuation of $7,000,000. In the neighborhood are Fort Frederick and the battlefields of Antietam and Gettysburg. It was settled about 1740 and was at first named Elizabethtown. It was incorporated in 1791. It was used as a base of operations during the Civil War. Pop. 17,749.

HAGGADAH, hạ-gä'dạ, one of two rabbinical biblical interpretations forming the Midrash (q.v.).

HAGGAI, hăg'ī, the 10th of the minor prophets, and first of those who prophesied after the captivity. He was born in Babylon, and joined the first band of exiles who, on the issue of the decree of Cyrus (536 B.C.) returned to their own land. He was buried among the priests at Jerusalem, as belonging to the family of Aaron. See HAGGAI, BOOK OF.

HAGGAI, Book of. In connection with the work of Haggai it is desirable to notice the historical situation just preceding. The precise events are difficult to trace with certainty, because the data are principally from the work of the Chronicler and are evidently not entirely historical. The accounts as given are as follows: Cyrus, king of Persia, in the first year after his conquest of Babylonia, 537, issued a decree permitting the return of the Jews and the rebuilding of the temple; this is given partly in 2 Chron. xxxvi, 22–23 and fully in Ezra i, 1–4. The return soon after this is told in Ezra i, 5–11. A list of those returning, with their number, 42,360, is given in Ezra ii. The subsequent events, principally building the altar and laying the foundation of the temple, are told in Ezra iii–iv. It is probable, being in accord with the general policy of Cyrus, that he issued such a decree as is mentioned. But the list of those returning is a later list; it is probable that those returning at first were a much smaller number, with others returning later. But the total number of those returning in the early years is probably much less than that given in Ezra, this being in accord with the situation as depicted in Haggai and Zechariah. The altar was probably built; it is shown to be standing by Haggai ii, 14. Nothing in Haggai and Zechariah indicates that the building of the temple was actually begun, which is, therefore, extremely doubtful. If begun, the progress was so small as to be negligible.

The work of Haggai was entirely during the year 520. He found the people in Palestine feeble and discouraged, lax in their religious observances. It is probable that the utterly disorganized condition of the Persian Empire at the beginning of the reign of Darius was a prominent consideration which led Haggai to think it a favorable time for the activity of the Jews; he anticipated no serious danger of interference by the Persians. His message was one of admonition and encouragement to the Jews, exhorting them to build the temple. His arguments are principally that their present lack of prosperity is due to their unfaithfulness in religious matters, and that the building of the temple and faithfulness in worship will bring prosperity. Verses 20–23 (Chap. ii) have reference to the governor, Zerubbabel, of Davidic descent, and should probably be understood as predicting for him a career as the Messianic king, a prediction, if so, which was not fulfilled.

The work of Haggai was a practical one, and succeeded in inspiring the Jews to undertake the building of the temple. The thought of the book is such as is familiar from other prophets. It is characterized by the usual prophetic attitude of strong faith in Yahweh and confidence in his care for the nation, and presents vividly the future plans which Yahweh has for them.

All the sermons of the book are precisely dated. It is probable that the book was not written by Haggai himself but by one of his disciples. This is principally because the prophet is always described in the third person. But the account is given with so much definiteness that it must have been written very soon after 520. The book is generally considered to be practically a unit.

Bibliography.— Driver, S. R., 'The Minor Prophets' ('Century Bible', Edinburgh 1906); Mitchell, H. G., 'Haggai and Zechariah' ('International Critical Commentary,' New York 1912); Perowne, T. T., 'Haggai and Zechariah' ('Cambridge Bible,' Cambridge 1897).

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HAGGARD, hăg'ạrd, **Andrew Charles Parker,** English novelist: b. Bradenham Hall, Norfolk, 7 Feb. 1854. He is a brother of H. R. Haggard (q.v.) and besides serving with distinction in the English army has published 'Dodo and I'; 'Polyglot Poems'; 'Under Crescent and Star'; 'Love Rules the Camp,' and other books.

HAGGARD, SIR **Henry Rider,** English novelist: b. Bradenham Hall, Norfolk, England, 22 June 1856. At 19 he went as secretary to Natal, and served on the staff of Theophilus Shepstone during his mission to the Transvaal in 1877. In 1884 he was admitted to the bar of Lincoln's Inn, but has devoted his time mainly to authorship and agriculture. His novels of South African life have attained a wide popularity both at home and in the United States. Among his works are 'Cetewayo and His White Neighbors' (1882); 'Dawn' (1884); 'The Witch's Head' (1885); 'King Solomon's Mines' (1886); 'Jess' (1887); 'She' (1887); 'Allan Quatermain' (1887); 'Colonel Quaritch, V.C.' (1888); 'Cleopatra' (1889); 'Beatrice' (1890); 'Montezuma's Daughter' (1894); 'Doctor Therne' (1898); 'Lysbeth' (1901); 'Rural England' (1902); 'A Gardener's Year' (1905); 'The Poor and the Land' (1905); 'Benito' (1906); 'Fair Margaret' (1907); 'The Ghost Kings' (1908); 'Morning Star' (1910); 'Queen Sheba's Ring' (1910); 'Rural Denmark and Its Lessons' (1911); 'Red Eve' (1911); 'Child of Storm' (1913); 'The Wanderer's Necklace' (1914); 'The Holy Flower' (1915); 'Finished' (1917); 'Love Eternal' (1918). He was knighted in 1912.

HAGIOGRAPHA, hā-jī-ŏg'rạ-fạ, a Greek word, signifying sacred writings, first introduced by Epiphanius as the rendering of the Hebrew word *Ketubim* = writings. The third and last great division of the Old Testament books, the others being Torah (the Law) and Nebiim (the Prophets). The three-fold division is alluded to in the New Testament, the several parts being described as "the law" or "Moses," "the Prophets," and "the Psalms" (Luke xxiii, 44). In this passage the Psalms are the Hagiographa. When the division is twofold, the Law and the Prophets, the Hagiographa are merged in the second category (Matt. v, 17; xi, 13). In our present Hebrew Bibles the Hagiographa consist of 13 books thus arranged: Psalms, Proverbs, Job, Song of Solomon, Ruth, Lamentations, Ecclesiastes, Esther, Daniel, Ezra, Nehemiah and 1 and 2 Chronicles, but the list is otherwise drawn up by many authorities. The Talmud places Ruth first. Consult 'Jewish Encyclopedia' (1907); Mullen, T., 'The Canon of the Old Testament' (New York 1893).

HAGONOY, hä-gō-noi', Philippines, a pueblo of the province of Bulacán, island of Luzon, on the Grande de la Pampagna River, about three miles from Manila Bay, seven miles southwest of Malolos. Lake Hagonoy is partly within the precincts of the town; this lake dries up in the summer season, so that the lake bed can be cultivated. Pop. 20,100.

HAGOOD, Johnson, American soldier: b. Barnwell, S. C., 21 Feb. 1829; d. there, 4 Jan. 1898. At the beginning of the Civil War he entered the Confederate army and in 1862 became a brigadier-general. He fought against Gillmore at the siege of Charleston (1863), and was commander of Battery Wagner. With his brigade he participated in the battle of Cold Harbor, and subsequently was in the trenches at Petersburg. He took part also in the operations north of the James after the surrender of Fort Harrison, and commanded Bragg's rear guard at Fort Fisher.

HAGUE, hāg, Arnold, American geologist: b. Boston, 3 Dec. 1840. He was graduated at the Sheffield Scientific School of Yale (1863); studied three years at the universities of Göttingen and Heidelberg, and in 1867 was appointed assistant geologist on the United States geological exploration of the 40th parallel. Among his published works are 'The Volcanoes of California, Oregon and Washington Territory' (1883); 'The Volcanic Rocks of the Great Basin' (1884); 'The Volcanic Rocks of Salvador' (1886); 'Crystallization in the Igneous Rocks of Washoe, Nevada' (1892); 'Eureka district, Nevada, with atlas' (1892); 'Geology of the Yellowstone National Park' (1899); 'Early Tertiary Volcanoes of the Absaroka Range' (1899); 'Atlas of the Yellowstone National Park' (1904); 'Origin of the Thermal Waters of the Yellowstone National Park' (Presidential address, Geological Society of America 1911).

HAGUE, The (Dutch *hage*, hedge; *Gravenhage*, count's hedge), Holland, court capital of the country, the commercial capitals being Amsterdam and Rotterdam. It lies 33 miles southwest from Amsterdam, about 15 miles northwest of Rotterdam, within 3 miles of the sea. It is the residence of the sovereign and of the foreign ambassadors, and the seat of the States-General of the Netherlands, and of the principal part of the central administration of the kingdom. Among the most important structures are the royal palace, in the Nordeinde; the palace of the Prince of Orange; the palace of Prince Frederick of the Netherlands; the Binnenhof, a large irregular building, founded in 1249, and containing the hall of assembly of the States-General, and various government offices; the provincial government-house, a large roomy edifice; the town-hall; the Ministry of Justice; the municipal museum, containing pictures and antiquities; the royal library, containing 500,000 volumes, besides valuable collections of medals and cameos; a cannon foundry, one of the largest and most conspicuous buildings in the town; colonial office; war office; the national monument, erected to commemorate the restoration in 1813 of Dutch independence. There are many other monuments to attract attention, particularly the equestrian statue of William I of Orange, in front of the royal palace, and the figure of Spinoza, placed opposite the house in which he lived, etc. The royal collection of pictures, in the Mauritshuis, embraces a picture gallery chiefly confined to Dutch masters. The parks, gardens, markets and suburbs of the city are famous for their beauty and interest. The special educational facilities of the city are excellent, and there are good public schools. There are also many learned societies, among which may be mentioned The Hague Society for the Defense of the Christian Religion, the Witte Society, the Physics Society and the Netherland-India Institute. The Hague is not a manufacturing or commercial city, its chief revenues being derived from the court, the nobility and the throngs of foreigners who visit the city and Scheveningen, the famous watering place on the coast to which an excellent road and five tramways lead from The Hague.

The origin of The Hague may be traced to the building of a hunting seat of the counts of Holland at this point; the origin of its prosperity to its selection as a princely residence in 1250. It was the birthplace of William II, Prince of Orange, and William III, Prince of Orange and king of England. Here were held the International Peace Congress of 1907 and the First Peace Conference, called by invitation of the tsar of Russia. As one result of that Conference (18 May to 29 July 1899) a Permanent Court of Arbitration was established. (See Hague Court, The). Pop. (including Scheveningen) about 300,000.

HAGUE COURT, The, a permanent tribunal for international arbitration established as a result of The International Peace Conference, held in May, June and July 1899 at The

Hague, the governmental seat of the Netherlands.

The Hague International Peace Conference was one of the most important events which marked the close of the 19th century, and has been justly styled "the first great parliament of Man." The Conference assembled in response to a rescript issued by Tsar Nicholas II of Russia, 24 Aug. 1898, inviting to a conference all governments with representatives accredited to the Imperial Court. The Conference was to occupy itself with the great problem of universal peace, especially through the international diminution of armaments by land and sea, and the prevention of armed conflicts by pacific diplomatic procedure. The invitation was accepted by all the governments to whom it was tendered, and the first meeting for the Conference was fixed for 18 May 1899 at The Hague, — the capital of the Netherlands being selected, as stated by the Russian Minister of Foreign Affairs, because "His Imperial Majestry considered it advisable that the Conference should not sit in the capital of one of the Great Powers where so many political interests centre that might impede the progress of a work in which all the countries are equally interested." The Conference was held at the celebrated Huis ten Bosch — House in the Wood — the members assembling in the historically decorated Orange Hall. Each nation was represented by prominent diplomats, jurists, men of affairs, soldiers and sailors, the representatives of the United States being Ambassador Andrew D. White, Minister Newel, General Crozier of the army, Captain Mahan of the navy, Seth Low, mayor of New York, and F. W. Holls of the New York bar. The president of the Conference was Baron de Staal of the Russian delegation.

Three committees were formed to deal respectively with disarmament, regulations in warfare, and mediation and arbitration. The final act of the Conference, signed 29 July 1899, comprised three conventions or treaties embodying the results arrived at by the committees. The first and most important was the Convention for the Peaceful Adjustment of International Differences by the permanent institution of a Court of Arbitration in the midst of the independent powers, accessible to all. The second convention dealt with the laws and usages of war on land, and the third convention provided for the adaptation to naval warfare of the principles of the Geneva Convention of 1864. Regulations also prohibited the throwing of projectiles and explosives from balloons; the use of projectiles intended solely to diffuse deleterious and asphyxiating gases (this was not accepted by the United States and Great Britain); and the use of soft expansive bullets. The last two conventions embodied the wisest and most humane principles of military conduct resulting from a study and discussion of these matters during the half-century preceding, and which had their first codification in the "Instructions for Guidance of the Armies of the United States" issued at the beginning of the Civil War.

The Convention for the Peaceful Adjustment of International Differences, however, was the crowning work of the Conference, and was a source of much gratification to the advocates of international arbitration, as bringing to fruition a sentiment which for centuries had hoped for the establishment by the nations of the earth of some permanent form of congress or court, which should be vested with functions to ensure the preservation of peace and to deliver the world from the strife and carnage with which it had been afflicted in all the past ages.

During the last decade of the 19th century peace advocates had been persistent in their advocacy of a permanent court of arbitration. In 1894, at its meeting in Holland, the Inter-parliamentary Union, a voluntary organization of members of the national legislative bodies of the nations, adopted a declaration in favor of a permanent court of arbitration; and in 1896 resolutions to the same effect were unanimously adopted in the United States at the annual Mohawk Conference on international arbitration, and by the New York State Bar Association, the latter presenting to the President of the United States a memorial setting forth a permanent tribunal as the essential feature of any general scheme of arbitration. The honor of presenting such a proposition in The Hague Conference fell to Lord Pauncefote, chairman of the British delegation; Germany was antagonistic, but the sentiment was so strongly in its favor that the German delegates were induced to withdraw their objection, and provision was made for its consummation. The fourth division of the Convention in 47 articles provides for the creation of the court, defines its jurisdiction and the principles which are to guide it, specifies the manner in which its members are chosen, the rules governing its procedure, its awards and other necessary details. The Convention provides that each of the 26 signatory powers shall appoint for a term of six years as members of the Permanent Court not more than four persons "of recognized competence in questions of international law, enjoying the highest moral reputation." These persons constitute a Permanent Court of Arbitration, accessible at all times and acting in accordance with the prescribed rules of procedure; they do not, however, sit as a collective body, but when two or more nations have a case to submit to arbitration, they select by mutual agreement one, three or five members, who will act as the tribunal to try the case. Thus it happens some members of the court may never be called upon to discharge the functions of a judge. Also, although The Hague is designated as a place where the court shall hold its sessions, another place may be designated by agreement of the litigant parties. Under the presidency of the Dutch Minister of Foreign Affairs, the diplomatic agents of the signatory powers, in residence at The Hague, constitute a permanent council which serves as the office of the Permanent Court of Arbitration. The first cases adjudged by the court were the Pious Fund Claim between Mexico and the United States in 1902, and the difficulties of Venezuela with the United States and various European nations in 1903.

For the erection of a Temple of Peace to house a comprehensive library of international law and to include a courtroom that can be used as a meeting place for the Permanent Court of Arbitration, Andrew Carnegie on 25 April 1903 donated the sum of $1,500,000 to be administered by the government of the Netherlands as trustee for the other signatory powers of The Hague Convention of 29 July 1899.

The temple was designed by the French architect L. M. Cordonnier.

Decisions Rendered.— On 14 Oct. 1902 — In the matter of the case of the Pious Fund of the Californias between the United States and Mexico.

On 22 Feb. 1904 — Respecting the preferential claims of the creditor nations of Venezuela under the protocols of 7 May 1903.

On 22 May 1905 — In the difference between France, Germany and Great Britain on the one hand, and Japan on the other, respecting leases held in perpetuity.

On 22 May 1909 — In the matter of the Casablanca dispute between France and Germany.

On 8 Aug. 1909 — In the matter of the dispute between Great Britain and France, respecting the right of certain Muscat Dhows to fly the French flag.

On 23 Oct. 1909 — Respecting the maritime boundary between Norway and Sweden.

On 7 Sept. 1910 — In the North Atlantic Fisheries case between the United States and Great Britain.

On 25 Oct. 1910 — In the Orinoco steamship case between the United States and Venezuela.

On 24 Feb. 1911 — In the «Savarkar» case between Great Britain and France.

On 3 May 1912 — Claim of the Canevaro Brothers.

When the war in Europe began there were two cases pending before The Hague Court; in 1915 three were pending.

The members of the Permanent Court representing the United States, as shown by the list corrected to 1 Sept. 1915, were Judge George Gray, ex-Secretary Straus, ex-Secretary Elihu Root and Prof. John Bassett Moore.

Consult Foster, 'Arbitration and The Hague Court' (1904); Holls, 'The Peace Conference at The Hague' (1900); Hicks, 'Equality of States and Hague Conferences' (1908); Scott, 'Hague Peace Conferences' (1909); Higgins, 'Hague Peace Conferences' (1909); Lynch, 'Peace Problems' (1911); Gulick, S. L., 'The Fight for Peace' (New York 1915).

HAHN, hän, **August,** German Protestant theologian: b. Grossosterhausen, Saxony, 27 March 1792; d. Breslau, 13 May 1863. He studied at Leipzig, and was appointed in 1819 professor extraordinary of theology at Königsberg. In 1826 he became professor of theology at Leipzig, and in 1833 was called to Breslau, and in 1844 became general superintendent of the province of Silesia. Among his best-known works are his Hebrew Bible (1831) and his 'Bibliothek der Symbole und Glaubensiegeln der Apostolisch-Katholischen Kirche' (1842; 2d ed., 1878).

HAHNEMANN, hä'nĕ-män, **Samuel Christian Friedrich,** German physician; founder of the homœopathic system: b. Meissen, 10 April 1755; d. Paris, 2 July 1843. In 1775 he went to Leipzig, where, against his father's will, he studied medicine, and found the means chiefly by the translation of English medical works. At a later period he went to Vienna, and after some years he returned and completed his studies at Erlangen. He afterward practised medicine at various places, but gave it up for a time, until, in 1789, by the translation of Cullen's 'Materia Medica,' he was led to adopt a new method of cure. His system was fully explained in his 'Organon der rationellen Heilkunde' (1810). In 1820 the government prohibited him from dispensing medicines, and thereby, from his inability to have them prepared by druggists, obliged him to give up his practice. Duke Ferdinand of Anhalt-Köthen, however, gave him an asylum at Köthen, and conferred upon him the title of Hofrath. Here he remained till 1833, when he proceeded to Paris, where he hoped to find a wider sphere for his operations. The result equaled his expectations; and a royal decree issued in 1835 authorized him to practise Homœopathy. Among his works should be named 'Dictionary of Materia Medica,' his 'Essays on Poisoning by Arsenic, and on the Effects of Coffee,' and his treatise on 'Chronic Affections.' Consult his 'Life and Letters,' edited by Bradford (1895). See HOMŒOPATHY.

HAIDA, hī'dạ, the native name for the Indians of Queen Charlotte Islands, in British Columbia and the southern end of Prince of Wales Island, in Alaska. The family name is generally given as Skittagetan. The Haida are very closely related physically and linguistically to the Tlingit and Tsimshian, and the three peoples are frequently grouped together. Juan Pérez, a Spanish ensign who visited the Queen Charlotte Islands in 1774, is the first to mention these regions and their people. Two other Spanish explorers had visited the islands by 1786. The following year Captain Dixon spent six weeks in exploring them and gave them their present name in honor of his ship, the *Queen Charlotte*. The fur trade was soon established on the Pacific coast and the Indians enlisted in its ranks of fur hunters and traders at which they proved very adept. But the change in the lives of the Indians, disease, especially smallpox, and immorality rapidly reduced their numbers and their moral stamina. The Haida who were further advanced in civilization than most of the west coast tribes of the United States, were just civilized enough to conform to the ways of the white traders without having sufficient knowledge to resist the evils that the advance guard of white civilization brought with it The Haida were good seamen and skilful fishermen. Their occupation in this direction was extended, on the coming of the whites to the Pacific coast of Canada. At Skidegate, the Haida have long been employed in catching dog-fish and in the work of extracting the oil from the same, which is done in the town on a large scale. During the summer many Haida Indians work in the salmon canneries on the mainland, which have also become a very extensive part of the Pacific coast industry. The Haida and the linguistically closely related tribes have taken naturally to the ways of the white men and have known, at the same time, how to turn many of their own aboriginal activities to account. They were, when first discovered, builders of fine sea-worthy boats; and they still continue to be among the successful boat-builders of the British Columbia coast. These they sell far up and down the coast and up the navigable streams, to their Indian neighbors and frequently to white traders, hunters, explorers and settlers. These boats are generally made of cedar or spruce. Practically all the Haida are at least nominally Christians as the result of the missions that have been established among them for many years. The Haidas have long had the reputation of being the most civilized of all the Indians of the Pacific coast and they have always been noted for their skill as carvers, canoe-builders, painters, decorators and house-builders; and they still exercise these trades. Haida-carved objects of wood and slate are well known to all the British Columbia and South Alaska inhabitants and to the visitors and tourists to these countries and they form no inconsiderable part of the demonstrations of Haida civilization in most Indian exhibits. The Haidas are very keen traders and property possession is on a firm base among them. When they first became known to the Europeans the Haida constructed fine and presentable dwellings of wood, with handsome carved totem poles and other ornamental features. Their canoes, which are made of cedar trunks, were often of size sufficient to carry half a hundred men; and with them they venture into the stormiest weathers of the Pacific or carried their goods up the inland rivers and streams. The houses of the Haida were among the most noticeable structures of the aborigines of the United States and Canada. Built of planks and boards, made with stone tools, they often presented a striking appearance both on account of their size and the ornate, carved adornment presented by many of them. The most noticeable feature of their houses, which were generally carefully painted outside, was a tall, carved totem pole which rose from the middle of one of the gable ends. Sometimes a house possessed several of these poles, all of which were elaborately carved. In this case they also appeared on the front of the edifice. These totem poles are still used by many of the Haida, especially in Alaska. The Haida were not only among the most intelligent trading nations of North American Indians, but they were held in respect by all the neighboring races and tribes as skilful warriors to be seriously reckoned with in any contest. On account of this general respect in which they were held, the Haida had great influence over the neighboring tribes; and this influence was often made use of by the Hudson's Bay Company and by independent traders to secure their ends in the Pacific coast countries. It has been claimed that the Haida believed in reincarnation, though to what extent and under what conditions do not seem to have been fully ascertained. In fact some of the best known investigators of Haida life, beliefs, customs and mythological and legendary lore appear to be none too trustworthy. Some of them are not even inclined to trust one another. This is unfortunate, since there is no Indian people north of Mexico more worthy of careful study and trustworthy presentation than the Haida, who erected mortuary posts to their dead and buried their deceased priests and chiefs in tombs consisting of wooden houses, generally in full view of the ocean or the water front. The Haida of Alaska are generally known as Kaigani or Ketshade. In 1841 the population of the Haida was over 8,000, according to an estimate made by John Work. Since then the Haida have diminished very considerably through the inroads of disease and dissipation and the breaking up of the old tribal life. The latter led to irregular marriage relations between the tribal women and the white traders and trappers in the Haida country. Many of the Haida have become regular and formal citizens, especially those of mixed blood; and have often, in this way, been lost sight of as members of the various Haida communities. In fact Haida Indians are often found far from their own recognized land limits, and not infrequently as far north as northern Alaska, or the Mackenzie River country in Canada. Therefore the present estimate of 1,000 as the probable number of Haida, is, in all probability, considerably short of the mark, especially if those of mixed blood are taken into consideration. Consult Swanton, 'Haid Texts' (New York); 'Ethnology of the Haida' (New York 1909); 'Haida Songs' (Leyden 1912).

John Hubert Cornyn,
Editorial Staff of The Americana.

HAIDARABAD, hī-da-ra-bäd. See Hyderabad.

HAIG, Sir Douglas, British soldier, commander-in-chief of the British Expeditionary Forces in France and Flanders: b. 19 June 1861. The youngest son of Mr. John Haig, of Cameronbridge, Fife, Scotland, he was educated at Clifton College and Oxford University. He passed the Staff College at Camberley and joined the 7th Hussars in 1885. He saw his first active service under Kitchener in the Nile Expedition of 1899. For meritorious conduct in the battles of Atbara and Omdurman he was mentioned in dispatches and promoted to major. His previous steps were — lieutenant, 1885; captain, 1891. In the South African War (1899–1902) he earned great distinction as a cavalry leader, serving throughout the whole of that arduous campaign both on the staff and in command of columns. As deputy-assistant-adjutant-general he was present at nearly every important action, including the battles of Elandslaagte, Rietfontein, the relief of Kimberley, Paardeberg and Diamond Hill. He was thrice mentioned in dispatches, established a reputation for dash and courage and held the record for rapidity of promotion among officers in the cavalry branch of the service. He was also chief of staff to Sir John French, and especially distinguished himself in the fighting round Colesberg.

After the war he rose to colonel; major-general in 1904, and later, inspector-general of cavalry in India. From 1907 to 1909 he was director of staff duties at army headquarters, and in 1909 returned to India as chief of staff. In 1910 he became lieutenant-general and in 1912 received the honor of being appointed colonel (i.e., commander) of the 17th Lancers, the «Death or Glory Boys,» one of the most historic and «crack» regiments in the British army, dating back to 1759.

From 1912 to the outbreak of the war in 1914, Sir Douglas was general officer commanding-in-chief at Aldershot. He accompanied Field-Marshal Sir John (now Viscount) French and the first small expeditionary force as commander of the First Army Corps, in that feverish struggle when every available ship was crammed with troops and rushed across the Channel to the aid of France and Belgium. Every nerve and sinew was strained to check the German avalanche. It is now no secret that in those dark days of the early stages of the war, when the fate of the Allies hung in the balance, the imperturbable confidence and cheerful optimism of Lieutenant-General Haig exerted a stimulating influence over the British troops. “When our officers wore long and solemn faces clouded with gloom,” wrote an eye-witness, “it was a holy inspiration to look at Haig. Never for a moment, in the blackest hour, did his faith in our ultimate success waver.” He played a chief part in the most hotly-contested battles of the campaign — at the first Ypres, at Neuve Chapelle, at Festubert and at Loos. A scientific soldier after the most modern plan, chary of speech, bold in design and resolute in execution, he raised the first army under his command to a foremost place among the British forces. He had the confidence of his men and earned the admiration of all who worked with him. In his dispatches Sir John French frequently paid glowing tribute to Haig's able and determined leadership. When the former asked to be relieved of his command after 16 months of severe and incessant strain, it was almost a foregone conclusion that Haig would succeed him. His appointment as commander-in-chief was announced 15 Dec. 1916, and two weeks later he was created field-marshal.

Among the numerous honors that have been conferred upon him are — K.C.V.O., 1909; C.B., 1900; K.C.I.E., 1911; K.C.B., 1913; G.C.B., 1915; G.C.V.O., 1916; Grand Cross of the Legion of Honor; Grand Cross of the Order of Leopold (Belgium); Grand Cross, Saint Maurice and Saint Lazarus (Italy); Obilitch Medal and Order of Danilo (Montengro). At the time of his high appointment he was a young man, too, as modern generals go — only 55 — the youngest, except the French General Gouraud, of all the great army chiefs in the West. Sir Douglas married, in 1905, the Hon. Dorothy Vivian, daughter of the 3d Lord Vivian; they have one daughter. In 1907 he published ‘Cavalry Studies.’ See WAR, EUROPEAN; FESTUBERT; MARNE; MONS; NEUVE CHAPELLE; SOMME; YPRES, ETC.

HAIL, small masses of ice or frozen rain falling from the clouds in showers or storms, varying in their form, being either angular, pyramidal or stellated; as well as in their consistency, being sometimes as hard as ice and sometimes as soft as snow. The theory that the formation of hail is dependent on the presence of whirlwind phenomena in the upper atmosphere, has gained considerable acceptance. The formation of the alternate coatings of ice and snow is, on this theory, produced by a series of vortical ascents and descents to and from an upper snow region and a lower region where the temperature is rather higher.

HAIL COLUMBIA, a national song of the United States. The words written during a period of great political excitement in 1798, by Judge Joseph Hopkinson, were set to the melody of the ‘President's March,’ composed the same year in honor of President Washington, by Pfyles, orchestral leader at the John Street Theatre, New York. The composition first sung at a theatrical benefit attained great popularity, and on account of its patriotic sentiments has become a representative national song.

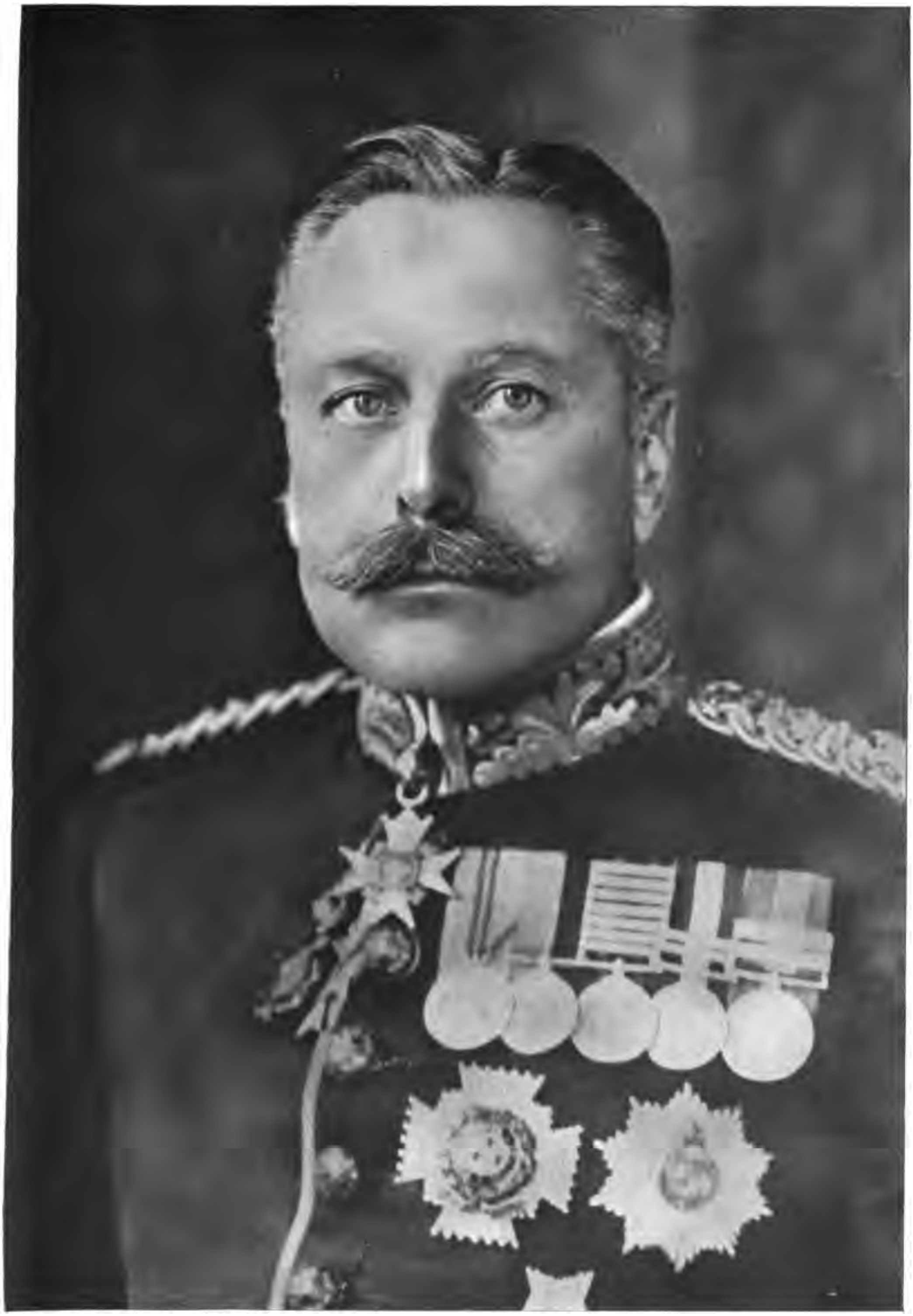
HAIL MARY, AVE MARIA, or **ANGELICAL SALUTATION**, a prayer consisting of three parts: the first, the words by which the angel addressed the Blessed Virgin (Luke i, 24) with the word Mary after “Hail”; the second, the words by which Elizabeth addressed Mary (Luke i, 42), to which has been added the word Jesus; the third, the words: “Holy Mary, Mother of God, pray for us sinners now and at the hour of our death — Amen.” The name, “Angelical Salutation,” comes from the first part of the prayer, which is the salutation of the angel. The first and second parts, taken from the Bible, were in use in their present form in early times; but the words of the third part were varied until the 16th century when the present form was approved and adopted by Pope Pius V. The prayer is in general use among Roman Catholics and is found in many Anglican books of devotion.

HAILES, Lord. See DALRYMPLE, SIR DAVID.

HAILEYBURY, Canada, the capital of the Temiskaming district of Ontario, on Lake Temiskaming, 107 miles north of North Bay on the Temiskaming and Northern Ontario Railway. It is in a good farming district; saw milling and lumbering are the chief industries; and it is the seat of a Roman Catholic cathedral. Cobalt and New Liskeard are connected by electric railway. Pop. 3,874.

HAILEYBURY COLLEGE, England, an institution at Hailey, near Hertford, 20 miles north of London, founded by the East India Company in 1806, as a training school for admittance to the service of the company. It attained a high reputation, and numbered among its former pupils the most distinguished names connected with the Indian administration of the 19th century and among its teachers such names as Malthus, Sir James Stephen and Sir James Mackintosh. After the Indian Mutiny of 1857–58, and the government reorganization of the Indian Civil Service, the college was closed for four years. It was reopened under a royal charter in 1862 as a public school, and while maintaining many of the traditions of its famous predecessor is no longer an Indian Service training ground. Handsome modern buildings have been added to the old college quadrangle, built in 1809; the surrounding grounds cover over 100 acres. Consult Lowell, ‘Colonial Civil Service’ (1900); Monier-Williams, ‘Memorials of Old Haileybury College’ (1894); and for the new school, Milford, ‘Haileybury College, Past and Present’ (1909).

HAILMANN, hāl'man, **William Nicholas**, American educator: b. Glarus, Switzerland, 20 Oct. 1836. He was educated in the gymnasium at Zürich; studied in Medical College, Louisville, Ky. (Hon. A.M. University of Louisville 1864; Ph.D. Ohio University 1885). He became teacher of natural science in the Louisville high schools 1856–65; director of the German and English Academy 1865–73; director of the German and English Academy, Milwaukee, 1873–78; director of the German-American Seminary, Detroit, 1878–83; superintendent of public schools Laporte, Ind., 1883–94; national superintendent of Indian schools, 1894–98. He was superintendent of instruction, Dayton, Ohio, 1898–1903 and head of the department of psychology, Chicago



FIELD-MARSHAL SIR DOUGLAS HAIG

Commander-in-Chief of the British Expeditionary Forces in France and Flanders (1915–)

Normal School, 1904–09; head of department of education at the Normal Training School, Cleveland, Ohio, 1909–15, when he retired to Pasadena, Cal. Among his writings are 'Outlines of a System of Object-teaching' (1866); 'History of Pedagogy' (1870); 'Kindergarten Culture' (1872); 'The Law of Childhood' (1878); 'Primary Methods' (1887); 'Application of Psychology to Teaching' (1887); 'Froebel's Education of Man' (1890); 'The English Language' (1902). He edited *Erziehungsblaetter* (1870–83); *Kindergarten Messenger* and *New Education* (1876–84). From 1883–94 he was one of the chief contributors of the National Educators' Association in the interest of the kindergarten and other features of the new education.

HAIR, strictly speaking, the peculiar epidermal covering of the body in mammals, although by analogy the term is loosely applied elsewhere, as to the setæ of annelids, the slender modified spines of caterpillars, etc. Hair is present in every mammal, although the amount may be greatly reduced so that in certain whales it occurs only in the fœtal stage, in others is limited to two bristles on the lips. The structure is best understood by following the development. In the earliest stage (Fig. 1) there is merely a thickening of the Malpighian layer of the epidermis (see SKIN) at the point where the hair is to be found. This thickening increases in amount, and thus forms a solid plug (Fig. 2) which projects into the underlying derma. At the same time the cells, which are scanty in most parts of the derma, become abundant beneath the ingrowing plug, and form the basis of the future papilla. Next a ring-shaped pit appears on the outer surface of the plug and gradually becomes deeper, cutting the epidermis into two parts, an outer root-sheath and an inner rod-like part, the hair itself, while the pit forms the follicle (see Fig. 3). The papilla grows into the base, bearing blood-vessels, while the Malpighian layer at this point forms the tissue from which the hair grows. In the hair itself several parts are recognized — a central pithy axis, the medulla; next, a layer of cells, the cortex, and outside this, forming the outer surface of the hair, the cuticle. Farther down in the follicle is the inner root-sheath, formed of two layers of cells known respectively by the names of the two anatomists, Henle and Huxley, who first described them. The Malpighian cells, at the base of the follicle, divide continually, and the new cells thus formed are pushed outward and are transformed into the hair. From this it will be seen that the hair is not a secretion but is composed of cornified cells. It is also apparent that the hair is not hollow.

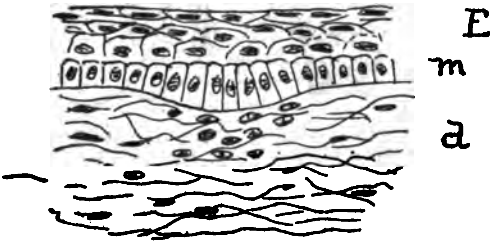


FIG. 1.— SECTION THROUGH THE EARLIEST STAGE OF HAIR FORMATION.

E, epidermis, showing in *m*, the Malpighian layer, the elongation of the cells; *d*, derma, with proliferation of cells to form the papilla shown in Fig. 2.

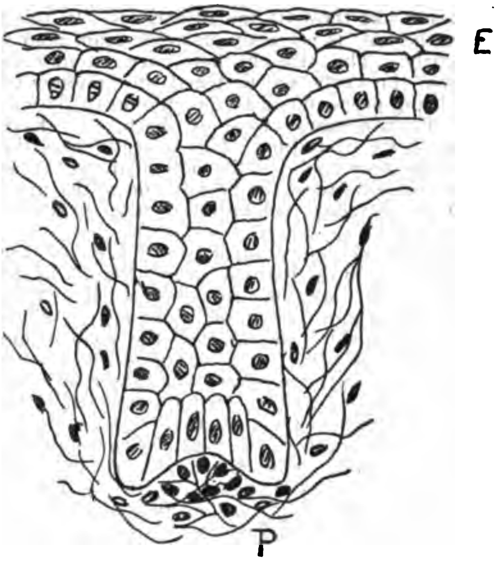


FIG. 2.— SECOND STAGE IN HAIR FORMATION.

The epidermis, *E*, has now formed a solid plug extending down into the derma; the papilla, *P*, has begun to form at the apex of the epidermal ingrowth.

The differences between the different kinds of hair are largely those of shape and of the amount of the various parts present. Thus in many animals two kinds of hair occur, longer and coarser hair on the outside, and beneath this a closer and softer under-fur. The coarser hairs may be enlarged into bristles, or still more

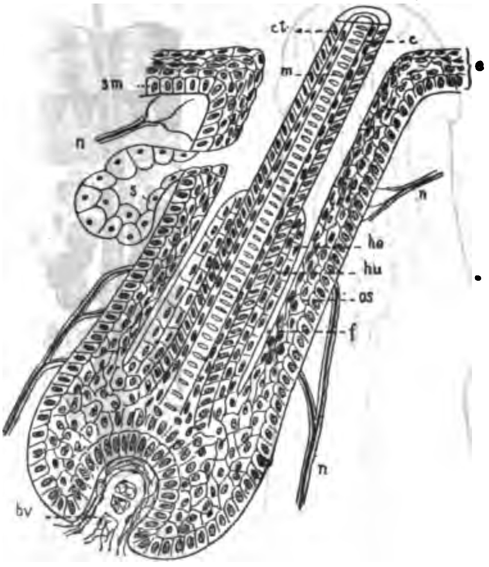


FIG. 3.— DIAGRAMMATIC SECTION OF HAIR AND HAIR FOLLICLE.

bv, blood vessel; *c*, cortex; *ct*, cuticle; *e*, epidermis; *f*, follicle: *he*, Henle's layer; *hu*, Huxley's layer (*he* and *hu* making up the inner root-sheath); *m*, medulla; *n*, nerve, *os*, outer root-sheath; *s*, sebaceous gland; *sm*, Malpighian layer of epidermis.

enlarged to form spines, like those of the porcupines and hedgehogs. Again the hairs may become united to each other, the result being the formation of scales like those of the pangolins or horns like those of the rhinoceros. In some cases the hair is perfectly straight, again it may be curly. The straight hairs are circular in section, the curly are flattened, the amount of curl being proportional to the amount of flattening. Certain hairs (wool of sheep, etc.) have the property of felting. This depends upon the scale-like projections of the cells of the cuticular layer. The color of the hair is due to the presence of pigments belonging to the group of melanins.

Several accessory structures (Fig. 5) are connected with the hair: sebaceous glands which empty an oily substance into the follicle to keep the hair in a moist, soft condition; nerves which are distributed to the wall of the follicle and thus render the hairs to a certain extent organs of touch, as in the whiskers (*vibrissæ*) of cats; and muscles for the erection of the hair (*erectorespilæ*). This erection may be to increase the warmth of the body by entangling a layer of air among the hairs, or it may have the purpose of protection against injury, either by terrifying some enemy or by affording a loose envelope around the body some distance from the flesh. Usually the hair is shed (molted) at regular intervals, but there are exceptions, as in the mane and tail of horses, as well as in the case of man. The hair is not scattered irregularly over the body but occurs with more or less regular arrangement. In the early embryos it is not uncommon to find it distributed in regular lines (Fig. 4). Later the lines become broken up into groups of hairs, the arrangement being characteristic of the species, but without any broad morphological significance. It should be noted that although hair and pinfeathers closely resemble each other in general appearance they are very distinct structures, hair originating in a thickening of the epidermis, while feathers (q.v.) like scales are dermal in origin. Most of the literature relating to the hair is in German. Consult general works in physiology and zoology, and the writings of Maurer, Meigerle, Weber and Poulton, *Quarterly Journal of Microscopical Science* (Vol. XXXVI, 1894).

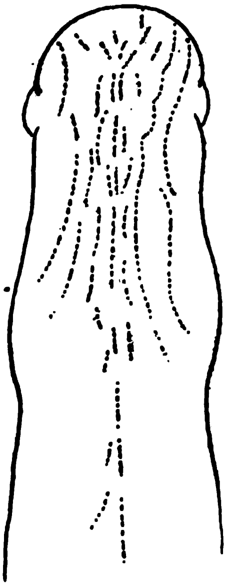


Fig. 4.—Hair tracts on the back of an embryo cat (after Maurer).

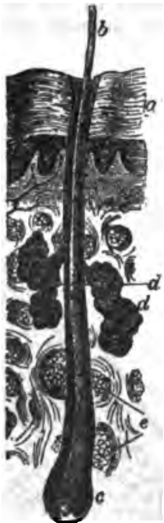


Fig. 5.—A Hair. Vertical section of skin, showing hair-follicle and related parts: *a*, epidermis; *b*, hair; *c*, hair-bulb; *d*, *d*, oil-glands; *e*, fat-cells.

HAIR-DRESSING. The head has ever been considered the noblest member of man, containing the brain which controls his actions. Hence the adornment of the head is a function dating from prehistoric times and reaching still to the least civilized aborigines of every country.

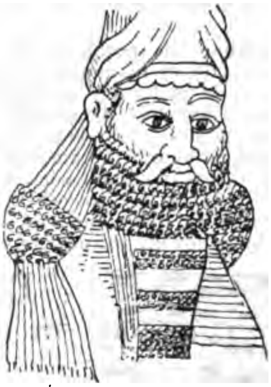


Fig. 1.—Ancient Assyrian style according to statuary.

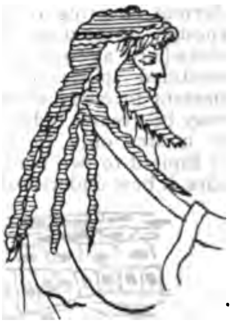


Fig. 2.—Ancient Greek style (from Athenian vase).

Thus we find the ancient Assyrians, Persians and Egyptians curled the hair and beard and replaced baldness with wigs. They anointed the hair, dyed it and adorned it with bands, ribbons, fillets and ornaments of precious or base metal. The Jews wore a thick head of hair and baldness engendered disgrace and suspicion of leprosy, but the consecrated, priestly Levites shaved their heads. Later the Jews looked upon long hair as a sign of effeminacy, and only those under a vow allowed their hair to grow long, though the women held long hair in esteem, curling and plaiting it. Combs are not mentioned in the Old Testament though other peoples were acquainted with them. The Greeks cut their hair rather short and curled it in small ringlets, but the children wore it long till with youth, assuming the position of *ephebe* (18 years old) they cut the hair short, sacrificing it to some god, usually Apollo. But the men of Sparta wore long hair while the boys' hair was short. It was universally the custom, as a sign of mourning, to allow the hair to grow long or let it hang down disheveled. Slaves were not allowed to wear long hair. Greek women parted their hair in the centre of the crown, carried it downward over both temples frequently in waves, bringing it toward the back and either fastening it together over the parting or wearing it on the back of the head in a tuft or knot. Usually, when the hair was so arranged it was covered by a wind of cloth, hood-like, or enclosed in a gold knotted net. The maiden cut off her hair before the wedding. Anacreon makes it appear that while blonde hair was preferred, black hair stood in high esteem. The custom of wearing false hair in Greece was derived from Asia. Athens gives us the first hair-dresser we know of; the curlers of hair were sufficiently numerous to form a special industry. According to Varro, the Romans used to let the hair grow long until 300 B.C. when P. Ticinius Mena brought the first «tonsor» from Sicily to Rome; in Cicero's day both young dandies and sober-minded statesmen walked around in their perfume-anointed, built-up curls. Women's hair decoration, from the Augustan period, took on greater dimensions and more complicated forms. The pile of plaits and curls of the wearer's head not sufficing, false hair, preferably blonde, was added. This latter was obtained from the conquered Germanic race.

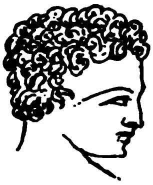


FIG. 3.— Greek ephebe.

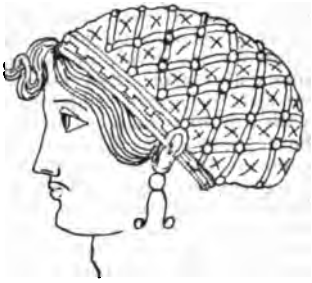


FIG. 4.— Greek woman.

The Celts, in northern Europe, bound their hair up behind the head, and this long coarse blonde hair was considered as a sign of honor and dignity, while the Celts and Germans considered the short cut hair represented servitude or a penalty of disgrace for breach of Germanic laws. The same hirsute conditions prevailed among the Franks. But Charles the Great and the Carolingians wore their hair short, while the Saxons, who had for centuries worn the hair and beard cut short, from the 9th century wore the hair hanging down over the shoulders or bound up and fastened with a pin. By the 11th century their hair still hung down over the shoulders but was cut short on the forehead, also crimped and curled. The women continued to wear their hair falling loose or held together in a *chapelle;* in England and France the hair was bound up by ribbons into one or two cues that fell over the shoulders from the back. The 14th and 15th centuries brought forth the most divergent conditions in hair-dressing fashions; men of station wore short hair for a while, later they allowed it to grow hanging down, sometimes curled. From the middle of the 14th century the women still wore long hair but in styles of head coverings or coifs in changing fashions. The cutting of men's hair quite short was introduced by Charles IV in France but does not appear to have become general till end of the 15th century; women, however, persisted in binding it at the neck and covering it with a hood. The soldiery cut their hair just as short as possible. In the Renaissance period the men combed their hair over the forehead and cut it off short. Louis XIII (17th century) wore a wig to cover his baldness; it was an elaborate curled affair. But when Louis XIV, on account of his small stature, started to wear high heels and a towering curled wig, the style spread from king to courtiers and the upper classes. The short-cropped Puritans («round-heads») of Cromwell, in England were fighting long-curled «royalists» the while. The tall, curled wig was introduced into England when Charles II returned from his French exile on the Restoration (1660). By this time wig powdering became general. If the women wore no wigs, nevertheless they built up their hair into towering heights at great expenditure of time and labor; on festive occasions some ladies had to permit the over-worked hair-dresser to do the elaborate hirsute creation the night before and the mistresses of the sumptuous tresses were obliged to spend the night seated in chairs to avoid mussing the delicate structure. The French Revolution changed all that, sumptuous royal fashions fell into disrepute, also the wig, the men wearing, for the most part, short hair, which has remained largely the case ever since. In England a tax was laid on wigs in 1795, amounting to a guinea a year; it raised as much as £20,000 one year, but it was repealed in 1860. The bag-wig prevailed in England, made to hold up the back-hair during the 18th century, but all wigs disappeared about 1810, except with the legal fraternity. But during the latter part of the 18th century the women retained elaborate toilets, adopting the style of the ladies of ancient Rome for a while and surrounding the forehead with little curls while the rest of the hair was fastened together

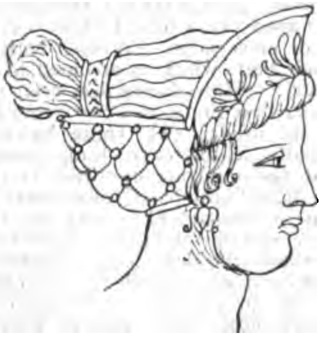


FIG. 5.— Greek lady.

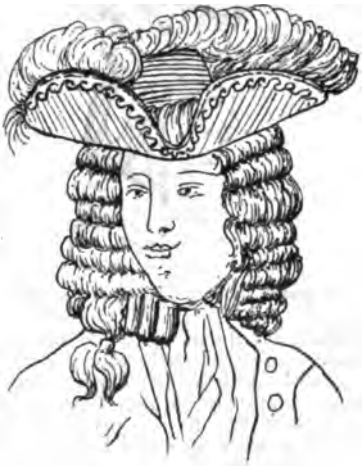


FIG. 6.— Three-cornered hat and wig, 1470.

on the neck or hanged down in a chignon. For a little while the ladies wore their hair short (*à la Titus*), a fashion that was renewed about 1890 for a little while. Next came the fashion of having the curls hang down in the neck (*à l'enfant*) as long hair came into its own again. It was next tied up and brought into the widest possible plaits which rested, wreath-like, on the head, while on either side a veritable forest of curls adorned the temples. Giant combs of delicate workmanship towered above and diamonds, pearls, flowers, etc., were interspersed in groups. During the transition to simplicity Greek styles of hair-dressing were attempted but the hair-dresser prevailed and wrought his most extravagant styles, without distinctive character or regular form, however. Immense chignons and beaver-tails alternated with apparently tumbled about hair and forests of curls. But, like with women's costume, the fashions in hair-dressing were subjected to rapid changes, generally running to opposite extremes, often grotesque.

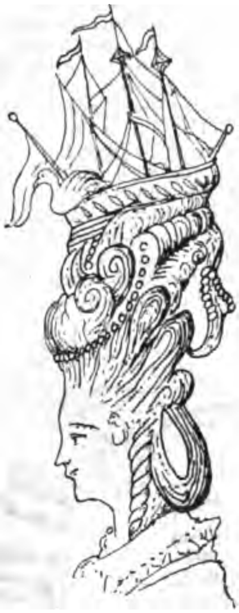


FIG. 7.— Coiffure à la frégate, Marie Antoinette period (end 18th century).

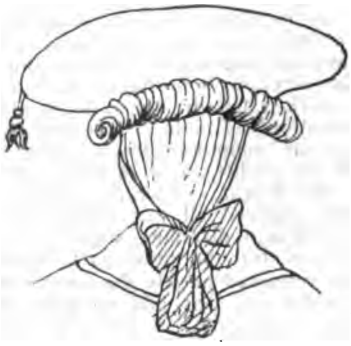


FIG. 8.— French bag-wig (end 18th century).

We find much greater stability in the hair-dressing styles of the nations outside of Europe. With the children of nature of Africa, Asia, the Americas and Australia, we find its men attempting to look ferocious by letting their hair hang down like manes or with great erections of plaits held together with oil or clay. The women wear their hair frequently short or plaited or rolled up in a lump. The Arab women divide their hair into innumerable plaits into which they interweave gold threads, strings of pearls, ribbons, etc., and cover it with a light turban. The Arab men wear their hair short. The Chinese shave the head except on the crown from which they allow a long cue to grow. The Japanese shave the head in front and wear short hair at the back and sides. The women comb back the hair from all sides and bring it up in a cluster on the top of the head, then decorate it in a most elaborate manner with big combs and long needles, flowers, etc. With both the latter nations European fashions are being adopted to the gradual exclusion of ancient customs. Among the Turks and Persians it is the custom to shave the head in part, while the women wear their hair in long plaits that they lengthen with silk ones of like color.

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HAIR DYE, any preparation for coloring the human hair more or less permanently, usually applied to darken gray hair, but sometimes because a person is not pleased with the natural color. Men often dye their moustaches, which are apt to be a little higher in color than the hair, or more sandy. Women both dye and bleach their hair, which is assumed to enhance their beauty. Hair dyeing has been practised from the earliest times, and two general classes of dyes are used: (1) Those based on the mineral salts, as mercury, lead, bismuth and silver; of these nitrate of silver is the most common. (2) Those based on a vegetable stain, as walnut or henna. The latter are harmless, but all the metallic dyes appear to injure the hair. Perhaps the least objectionable of the metallic hair dyes is made from sulphate of iron, in the proportion of 10 grains to an ounce of glycerine and a pint of water. This may be applied with a brush once a day, and each application gives the hair a deeper shade of brown, until a brown-black is attained. It will color the skin as well as the hair, hence must be applied with care. Nearly all hair dyes will also tan the skin, and it is common to apply first some form of grease on the skin to prevent any dye from adhering. Pulped walnut skins make an excellent dark brown dye, and they can be put up with either alcohol or cottonseed oil, with a trace of perfume. An infusion of henna leaves in alcohol makes a satisfactory brown dye, which can be darkened by adding a little ammonia. In applying nitrate of silver dye, it is first desirable to soak the hair in a solution of sulphite of potassium, and the stronger the solution the darker will be the resultant dye. The solution of nitrate of silver is added while the hair is still wet with the potassium; the result is claimed to be quite permanent. A simple method of slightly darkening the eyebrows or moustache is to use a lead comb daily, which gradually darkens the hair. To lighten the hair peroxide of hydrogen is used, giving a so-called gold tinge, and producing artificial blonde hair, or a "peroxide blonde." The dyeing of false hair is much easier than dyeing on the human head, and a greater variety of dyes may be used. Any dye suitable for cotton or wool can be utilized. A solution of logwood in warm lime-water is commonly used for brown dye; but the hair should first be well washed in alum water. To remove hair dye stains from the hands, washing with a bleaching powder is recommended, followed by an alcohol wash. Nitrate of silver stains may be removed by applying a weak solution of sulphydrate of ammonia.

HAIR MANUFACTURES. Hair enters into the manufacture of many civilized conveniences. It is the most useful material for brushes, and the stiff bristles of the pig go into tooth-brushes, clothes-brushes, etc., while softer brushes, as for hats, painting in oils, etc., often call for softer hair. For special purposes the artist uses brushes of skunk's hair, camel's hair and sable. The once famous camel's-hair shawls are now seldom seen, and the haircloth shirts of the monks and the still more ancient sackcloth of biblical times remain only in a historical sense. But the public does wear a great deal of hair worked into felt goods, especially hats, cheap overcoats, blankets and the like. The hair of rabbits, dogs, goats and woodchucks is valued for such purposes, but the cow and steer yield the most. Cowhair and waste hair of any kind are also freely used in certain roofing materials, and as a binding material for the plasterer. The tail hair of cattle often does duty for the more valuable horsehair which may be woven into such beautiful and durable cloth, once popular as a furniture covering, but now reserved for more utilitarian purposes. The stiffening of garments is frequently of horsehair cloth which is called haircloth, though it has a cotton warp; also the screening cloths used in expressing various oils, and for retaining the solid matter of the cider press. Excellent fishing lines are made of braided horsehair. Power looms are made on purpose for weaving the horsehair. Camel's hair is also woven on the loom, and the long silky hair of the yak, the wild ox of Tibet, makes a beautiful fabric and also a coarse lace. Goat hair, pig hair, barbers' sweepings, and any convenient waste hair is utilized for stuffing cushions in upholstery. Many mattresses are supposed to be made of horsehair, but this is so valuable that other hair is introduced, and also various imitations that should be called fibres. (For the uses of wool, which is really the most common hair, see WOOL). The handling and making over of human hair is a considerable industry, most of it being for false hair of one sort or another. For many years the peasant girls of southern France, and also of Belgium and Switzerland, gave up many of their locks and tresses for making switches and curls for their less favored sisters in other lands. The greater the length and the more golden the color the better the price obtained for them. Beautiful hair more than five feet in length has found its way into the beauty parlors of the great cities of the Western world. The shorter hair offered for sale is more commonly picked out from women's combings that have been saved and combed out. These are valued for curls, frizzes, false fronts, puffs, wigs, etc. They require to be carefully selected, shaped and dyed. (See HAIR DYE). The toupee, favored by many "bald-heads," is usually made up from the best of the long stock recovered by the barber, which is purchased, woven into shape and dyed to order.

The United States census classifies as hair work all factories that clean, bleach, curl and dye human hair, also that of the horse, camel, yak and Angora goat, the latter being termed mohair. The hair of the yak and goat works up well in theatrical wigs, false beards, etc. This portion of the hair industry of the United States (1914 census) occupies 205 factories, with a total capital of $2,543,000, and 1,193 wage earners, utilizing materials of the value of $1,529,000, and producing $3,335,000 value annually. Sixty per cent of this industry is in New York State, and 59 per cent in New York city. The hair cloth branch of the industry includes only 19 establishments and 595 employees, yet its gross product is two-thirds as large and its capitalization larger than the hair work branch. With materials valued at $1,635,000, the gross product is $2,395,000, on a capital of $2,945,000. Fifteen of the 19 factories are located in Pennsylvania.

HAIR PENCIL, in painting, a fine brush made of the hairs of the camel, sable, badger, squirrel, marten, raccoon, goat, etc. The various sizes require the quills of the crow, pigeon, goose, turkey or swan. Hair pencils are used by artists in water colors, and in other very fine work.

HAIR-TAIL. See SCABBARD-FISH.

HAIRLESS DOGS. Several races of domestic dogs are bred in the warmer parts of the world, whose skins are nearly hairless. In China and Farther India a large dog of this description, called polygar, is used in hunting. Central Africa has a breed resembling a small black greyhound. A hairless dog is found mummified in prehistoric Peruvian tombs, and others were formerly prevalent in the West Indies, or are still known in Mexico. These have been cultivated by fanciers in the United States, and constitute a recognized show class. They are small and terrier-like, brownish or bluish-black, wrinkled, and have only a few straggling hairs on the body, with sometimes a tuft on the head.

HAIRWORM, or **HAIR SNAKE,** a nematode so named because of its supposed origin from a horse hair that has fallen into water. See GORDIACEA.

HAITI, a republic comprising the western portion of the island of Santo Domingo or Haiti. Its area is 10,200 square miles, between one-third and four-elevenths of the total area of the island, the central and eastern portions of which are held by the Dominican Republic. Adjacent islands subject to the Republic of Haiti are: La Gonave, commanding the approach by water to the capital; Tortuga Island, near Port de Paix, and Vache or La Vache, near Aux Cayes. The ports, besides that of the capital, Port-au-Prince, are Port de Paix, Cape Haitien, Gonaives, Saint Marc, Petit Goave, Jeremie, Miragoane, Aux Cayes, Jacmel, and Aquin. Rivers are the Artibonite, navigable for 100 miles, the Trois Rivieres and the Grand Anse. The largest lake is Etang Saumatre, 22 miles long and 60 miles wide. The climate, which in the highlands is temperate, but in the lowlands tropical, even more so than that of the Dominican Republic, favors the development of a varied and extensive flora. The fauna, on the other hand, is limited here as in many other parts of the West Indies.

History.— At the time of the discovery of the north coast, 6 Dec. 1492, the island was divided into five states or cacicats. Thus disunited, the aboriginal inhabitants were rather easily conquered, rapidly exterminated. The natives could not stand the hard work imposed on them by the Spaniards who began the importation of African slaves. In 1630, French buccaneers and freebooters undertook the conquest of what became Saint Domingue. From the intercourse between white and black resulted in Saint Domingue an intermediary class of mulattoes most of whom were free people without any political rights. They at first did not resent this.

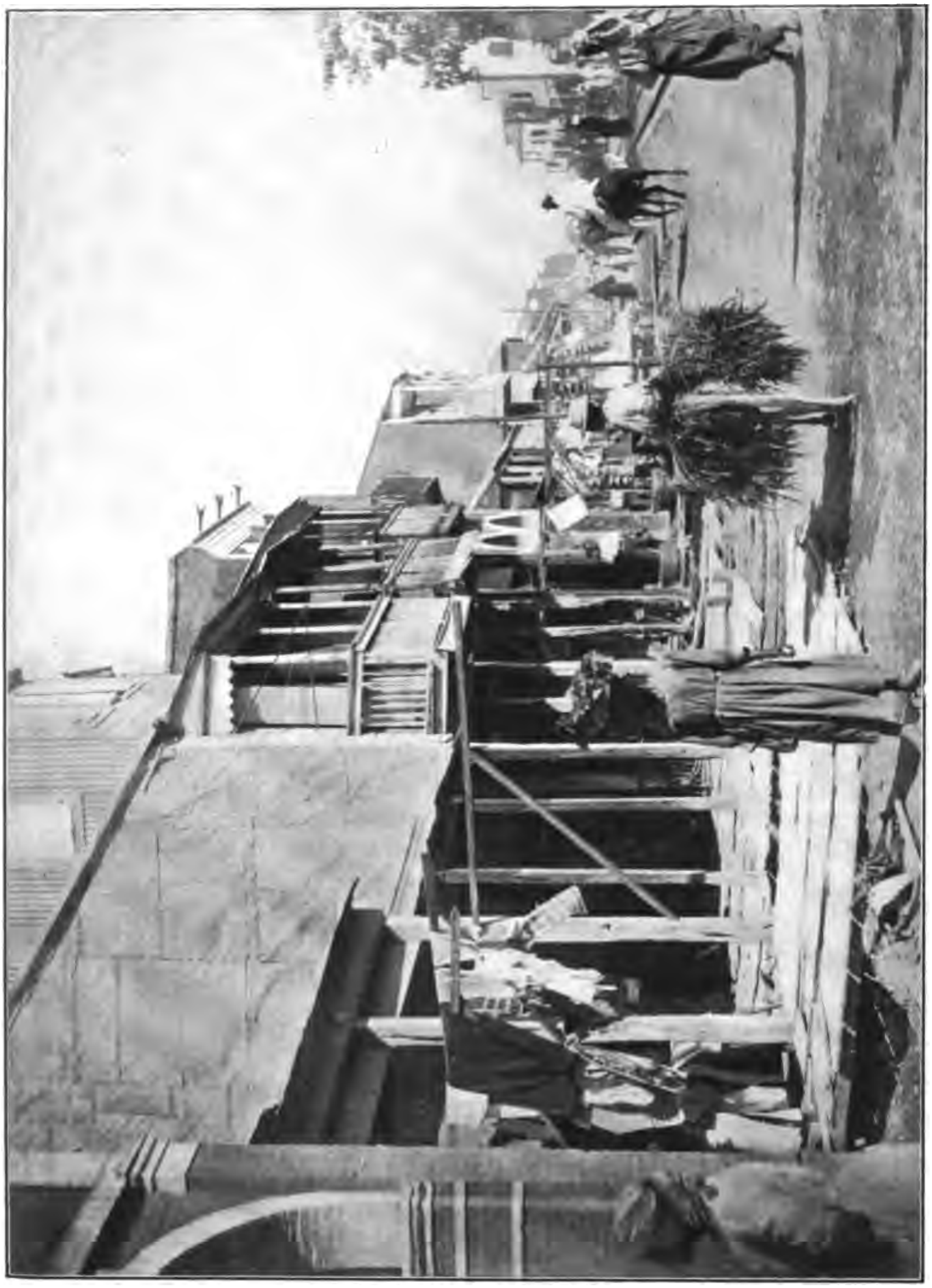
In 1789 the freedmen who had accumulated wealth asked for equality of political rights which the Assemblée Nationale granted them. But the French landlords or «colons» objected and a hard struggle began. The «colons» called the English to their help. At the end of the year 1793, the latter took possession of a part of the island which seemed lost to France, being occupied partly by Spaniards, partly by English, when Toussaint l'Ouverture espoused the cause of France. This extraordinary man, who, up to 40 years age, had been a slave, succeeded in ridding the country of the Spaniards and English. The French government rewarded him by appointing him major-general and governor of the island. Later on, Napoleon I, who thought that Toussaint l'Ouverture was too powerful, appointed General Leclerc governor of the colony, and sent a formidable army to reduce the authority of l'Ouverture. The latter, after a few skirmishes, surrendered and retired on one of his properties. Leclerc caused him to be arrested and deported to France in June 1802. The colored people took up arms against French domination in September 1802 under the leadership of General Dessalines; and by the end of 1803, Rochambeau, who on the death of General Leclerc had taken command of the French army, was hard pressed in the city of Cape Haytien by black troops, and compelled to capitulate. On 1 Jan. 1804 Haiti proclaimed its independence, with General Dessalines as ruler. Slavery was abolished. In 1822 the Spanish part of the island came under the administration of Haiti; but in 1844 it seceded and established an independent government, known to-day as the Dominican Republic (q.v.).

In Haiti, the record for the 67 years next following is little more than one long series of revolutions and usurpations, often mere contests between representatives of the mulatto and black elements. At the end of that period, during the turbulent administrations of Lecomte, Tancrède and Oreste, prominence was given to demands for payment of arrears of the republic's foreign debt; and arrangements for the arbitration of French claims had actually been concluded when the government was overthrown by Théodore and Zamor (1914). The latter made himself president for a short time, until he was forcibly dispossessed by the former. On 7 Jan. 1915 a revolt against President Théodore occurred. Again, in April and July, revolution, the massacre of political prisoners and the murder of President Guillaume, Théodore's successor, made necessary the landing of American marines to restore order. Continued revolutionary uprisings led to more active intervention, and on 16 Sept. 1915 a treaty was signed which provided for the establishment of a receivership of customs and supervision of Haitian finances, for a term of 10 years, under control of the United States, and the formation of a native constabulary commanded by American officers. Sudre Dartiguenave was elected President of the republic toward the end of 1915; and with the support of the United States government, his administration proved peaceful and progressive.

The constitution dates from 9 Oct. 1889. The National Assembly embraces two bodies, the Chamber of Representatives and the Senate, the former consisting of 99 members, elected by the people for three years, and the latter of 39 members chosen for terms of six years by the representatives from lists supplied by the President of the republic and a board of electors. The President, elected by the National Assembly for a term of seven years, cannot be re-elected except after an interval of at least one term. His cabinet comprises six members, the secretaries of Foreign Relations, of War and Navy, of Interior and General Police, of Finance and Commerce, of Justice and Public Instruction, of Public Works and Agriculture. The judiciary includes the Supreme Court, the «Tribunal de Cassation» and a number of district and municipal courts.

National Activities.— Primary education is, by law, compulsory and free. The number of registered pupils in the five departments of the republic in 1914 was 46,018. There are over 400 secular schools; a school of agriculture and domestic science for girls; several public *lycées;* schools of medicine and law; and private schools receiving allowances from the government. French is the language of Haiti, though the country people speak a patois called «creole.» The prevailing religion is Roman Catholicism. There is an archbishop and three bishops, and every commune has at least one priest. The papacy maintains a legate at Port-au-Prince, and Haiti has a minister accredited to the Holy See. Freedom of conscience is, however, guaranteed in the republic. About $1,000,000 annually is allotted by the government to public instruction.

The most important products of Haiti are



Main Street, Port-Au-Prince

coffee, cacao, cotton, Campeachy wood, lignum-vitæ and fustic. The mineral resources are undeveloped. Deposits of gold, iron, copper, silver, nickel, antimony, tin, sulphur, kaolin, gypsum and a large variety of stone and soft coal are among those that have been definitely located. Copper is worked to some extent and concessions have been granted for the mining of coal, iron and other minerals. The manufacture of articles for the home market gives employment to a relatively small number of the inhabitants.

Principal exports in the year 1914 were: Coffee, 78,512,559 pounds; cacao, 6,688,084 pounds; cotton, 3,121,839 pounds; cottonseed, 5,369,175 pounds; logwood (Campeachy wood), 54,618,800 pounds; fustic (yellow wood), 55,000 pounds; lignum vitæ, 3,090,020 pounds; honey, 1,264,690 pounds. The value of foreign commerce in that year was $18,928,351, imports, $7,612,792, and exports, $11,315,559 est. The distribution of foreign trade was given as follows: United States, imports $6,381,688 and exports $1,000,000; France, imports $345,190 and exports $5,000,000; Great Britain, imports $409,811 and exports $800,000; Germany, imports $338,004 and exports $4,200,000. Imports from the United States into Haiti in 1916 were more than 130 per cent greater than in the preceding year. In 1915 they amounted to $3,806,672 and in 1916 to $8,775,694, an increase of $4,968,392. This gain is due largely to continued peace throughout the country, which has enabled the people to work and be paid for their labor.

Haiti has 70 miles of railways. These include the line running from Cape Haitien to Grand Riviere, 15 miles; that connecting Port-au-Prince with Lake Etang Saumatre 28 miles, and the Port-au-Prince and Leoganes Railroad, 22 miles. Port-au-Prince has five miles of tramway. Regular service from New York and from Southern ports is supplied by three steamship lines. There is also steamship service between Haiti and Cuba. In 1880 Haiti became a member of the International Union. There are now 30 post offices in the republic. The extent of telegraph lines is about 124 miles.

Finance and Population.— The national debt (excluding the currency debt) amounted to $25,982,181 gold on 1 July 1914; the currency debt to $13,534,812 in the paper money, nickel and the floating debt. The revenue, derived almost exclusively from duties on exports and imports paid in American gold, amounted in the fiscal year 1914–15 to 4,980,146 and 4,959,386 paper gourdes (value of gourde $0.33 in 1915; average for five years about 20 cents). More than one-half of the expenditure is for the public debt. The monetary system has as its basis, theoretically, the gourde, which, in gold, would have the value of $0.965, currency of the United States. But no gold coins were ever minted, and the actual currency is paper which fluctuates in value and is irredeemable.

The number of inhabitants, according to an estimate for 1917, is about 2,030,000; and the population of the capital, Port-au-Prince, was given as 100,000; Cape Haitien 30,000; Les Cayes 12,000; Gonawes 13,000; Port de Paix 10,000. Residing in the republic are about 500 white foreigners (Haitian citizens only can own real estate); otherwise the population consists of blacks and mulattoes, the former about 90 per cent of the total.

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Marrion Wilcox.

HAITI, Diplomatic Relations of the United States with. Haiti, founded by ex-slaves who revolted against their masters and confiscated their property, began its nationality as an international outcast and was long regarded with disfavor by the great powers which had neighboring territory. Against its early struggle for independence from French control, the American government recognized the French *arrêtés* of 1802–06 prohibiting trade with Hispaniola ports occupied by the blacks, and in 1806 and 1807 assisted in enforcing them by acts of Congress forbidding intercourse with every part of the island not in actual possession of the French government. Although it was practically independent by 1804, it was not recognized by France until 1838. Although for its continued independence the American Monroe Doctrine is largely responsible, the American government, influenced by slavery interests, hesitated in 1825–26 to participate in the Panama Congress because Haiti was invited, and withheld formal recognition of the Haitian government until 1862.

Twice before 1860 the American government found it necessary to resort to informal diplomatic relations. In 1832 the Jackson administration sought through a naval officer to procure the abolition of Haitian discriminating duties which operated against American commerce. In 1851, acting on invitation of the Dominican Republic for joint mediation of the United States, France and Great Britain to secure peace with Haiti, the Fillmore administration sent a special agent to co-operate with the representatives of France and Great Britain in a remonstrance against Haiti with a view to possible joint intervention to cause the Haitian government to stop the war and recognize the independence of the Dominican Republic.

American diplomatic relations, after recognition of Haiti in 1862, as indicated by the published correspondence, largely consisted in the consideration of insurrections (local and general) and changes of government, unjust treatment of foreigners, arrests and imprisonments of American citizens, the right of asylum for fugitives or refugees, blockade of ports, martial law, political and financial conditions resulting from anarchy and Haitian interference in Dominican affairs. During the American Civil War, Secretary Seward succeeded in leasing the harbor of Mole Saint Nicholas from Haiti as a naval station. In 1865, when the government of Haiti requested the British government to concur in guaranteeing the neutrality of the peninsula of Samana, Seward informed the British Minister that the United States by long-settled policy was disinclined to political alliances with foreign states in regard to subjects outside the range of necessary and immediate domestic legislation, and must refrain from making such a guarantee while disclaiming all purpose or desire to disturb the peace and security of Haiti.

Early in 1870, the American government learning that the President of Haiti during pending American negotiations with the Dominican government had aided General Cabral in a revolution against the Dominican government, notified the Haitian government that any military movement against the Dominican Republic would be considered as an hostile act against the United States. It sent Admiral Poor via Port au Prince to use force to prevent interference. Late in the same year on complaint of the Dominican government that the Haitian government was furnishing war materials to Dominican insurgents, the American government again warned the Haitian government. In 1877 it instructed the American Minister to Haiti to urge that the Haitian legislature should not repudiate the contracts or engagements of the preceding legislature.

In 1844, by protocol the Pelletier claims case which arose in 1861 was submitted to an arbitrator. An award made in 1885 against Haiti was rejected by the American government on the ground that it was unjust.

In 1882–84 the United States declined to entertain proposals of the President of Haiti for cession of a naval station. In 1884, learning that Haiti contemplated a transfer of territory to France, the American government informed the French government that such acquisition of Haitian territory would conflict with the Monroe Doctrine. France denied any intention of acquisition. Soon thereafter the American government made a similar statement to England. In 1888, Secretary Bayard referring to the rumors in Haiti regarding the efforts of the French representatives to induce France to declare a protectorate or annexation and at the same time considering the possibilities of the French government being asked to undertake the completion of the Panama Canal instructed the American Minister at Paris again to take the opportunity by explicit language, without referring to affairs in Panama, to recall the American traditional policy of which France had been informed 25 years before and also at the commencement of work upon the Panama Canal by the French company in 1884–85.

In 1891, the American government sent a special naval commissioner to Haiti with a fleet to endeavor in co-operation with the American Minister to obtain a lease of Mole Saint Nicholas as a naval station, but the proposals were declined.

In 1894 the American government objected to Haitian discrimination in favor of sailing vessels; and in 1897 and 1898 it protested against acts involving discrimination against American citizens in Haiti.

In December 1897, when German vessels threatened to shell the public buildings at Port au Prince unless the Haitian government acceded to its demands, resulting from the arrest and imprisonment of a German liveryman, the American Minister in Haiti urged the application of the Monroe Doctrine and the Haitian government applied for a treaty arrangement which practically would have established an American protectorate; but Secretary Sherman, opposed to a policy of establishing protectorates over neighbors, urged Mr. Powell not to proceed on the hypothesis that the United States had a duty to protect neighbors against their responsibilities. In 1900 when the German Minister suggested the establishment through act of the foreign powers of an independent tribunal at Haiti to try foreign litigations not triable in the Haitian tribunal, Secretary Hay declined to approve the proposed measure interfering with the sovereign right of Haiti but suggested independent friendly representation to the Haitian government in regard to the defects in the administration of justice.

After the Franco-Haitian commercial treaty of 1900, reducing tonnage dues paid by French sailing vessels and duties on merchandise landed from French steamers, the American government promptly insisted that under the treaty of 1864 no higher duties could be collected on American vessels than were collected on the vessels of the most favored nation.

By the logic of events the American government was forced to accept larger responsibilities in Haiti. In 1912, it exercised an influence to prevent war between Haiti and the Dominican Republic. In 1914, as a result of continuous insurrectionary activity and consequent threatening clouds of international trouble, it undertook to secure supervisory control of the Haitian finances. In July 1915 in order to terminate an increasing reign of terror it landed marines to protect the legations, took possession of the fort, supervised the election, put naval paymasters in charge of the customs houses and finally completed negotiations for a convention establishing a fiscal and constabulary protectorate.

The new American responsibility in Haiti — whose government is an engine without a flywheel, threatening its own destruction by its own energy — is far greater than that assumed over other weak governments in the Caribbean region, and may raise problems far different from those of the other territories in which the American government exercises supervisory control.

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HAKE, Thomas Gordon, English poet and physician: b. Leeds, 10 March 1809; d. London, 11 Jan. 1895. He took his medical degree at Glasgow University in 1831, and practised his profession in East Anglia, later becoming the physician and friend of Dante Gabriel Rossetti. His poetry is thoroughly original, but very subtly philosophical. His works include ‘Poetic Lucubrations’ (1828); ‘Vates: A Prose Epic’ (1839); ‘Madeline with Other Poems’ (1871); ‘New Symbols’ (1876); ‘Maiden Ecstasy,’ verse (1880); ‘The Serpent Play, a Divine Pastoral’ (1883); ‘Memoirs of Eighty Years’ (1892).

HAKES, fishes of the family *Gadidæ* and chiefly of the genera *Phycis* and *Merluccius*, distinguishable from the cod and haddock by having only two dorsal fins. *Phycis* has a chin barbel and filamentous ventral fins, both of which are lacking in *Merluccius*. The squirrel-hake (*Phycis chuss*) and white hake (*P. tenuis*), both also called ling or codling, are common bottom fish on our Atlantic coast from Virginia northward. The silver hake or whiting (*Merluccius bilinearis*) has a similar range, but is less common in shallow waters and leads a roving life in search of herrings and other smaller fishes. Various other species occur in the north Atlantic and Pacific oceans. The hake fishery is of considerable extent, and the product is salted and sold chiefly as boneless cod. The dried air-bladders are utilized in the manufacture of isinglass.

HAKIM, hą-kēm′, a Turkish word, signifying lord and frequently in the Koran applied to Allah, God, as in the Greek and English versions of the Jewish Scriptures the word Lord is used for Jehovah. It is now-a-days especially given as a title of honor to the imperial physician of the sultan, who is Hakim bashi, that is to say, the chief of the physicians, always a Turk; whilst the physicians in the seraglio under him are western Europeans, Greeks and Jews.

HAKLUYT, hăk′loot, **Richard,** English geographer: b. about 1553; d. London, 23 Nov. 1616. He entered Christ Church College, Oxford, in 1570, and became so eminent for his acquaintance with cosmography that he was appointed public lecturer on that science. In 1582 he published a small collection of voyages and discoveries, forming the basis of a subsequent work on a larger scale. In 1584–88 he was in Paris as chaplain to Sir Edward Stafford. On his return he published (in 1589) his famous collection of ‘The Principal Navigations, Voyages, and Discoveries of the English Nation, made by Sea, or over Land, within the Compass of these 1500 Years.’ The first volume of a new edition of his great work was published in 1598, the second and third in 1599 and 1600. In 1602 he became prebendary, and in 1603 archdeacon, of Westminster, and next year he was appointed a chaplain of the Savoy. He was interred in Westminster Abbey. He published several other geographical works, among them ‘Virginia Richly Valued, etc.’ (1609), a translation from the Portuguese. An edition of his chief work appeared in 16 volumes (1885–90). The manuscript papers of Hakluyt were used by Purchas in his ‘Pilgrims.’

HAKLUYT SOCIETY, of Great Britain, organized in December 1846, for the purpose of printing and distributing among its members rare volumes on voyages and travels, and geographical records. Between 1847 and 1915 fully 170 volumes were issued under the editorial supervision of eminent authorities. Among these publications were ‘Select Letters of Columbus’ (1849); Raleigh, ‘Guiana’ (1848); and ‘Danish Arctic Expedition’ (1897); and five editions of Hakluyt's ‘Voyages’ (12 vols., 1903–05); and Purchas's ‘Hakluytus Posthumous; or Purchas His Pilgrimes’ (20 vols., 1905–07).

HAKON JARL. Oehlenschläger, after reading Snorre's ‘Heimskringla,’ during a stay in Halle in 1805, wrote ‘Hakon Jarl,’ his famous tragedy, in six weeks. The theme is the conflict between Paganism and Christianity. The characters, especially that of Earl Hakon, are described in masterly fashion by Snorre, who gives us the tense, dramatic scenes. This rich historical material supports most appropriately the fine, poetical structure of the dramatist, and serves to give the principal character the true stamp of human greatness. In the character of Hakon, the author wished to do full justice to the strength of the heathen ideal, and yet arouse sympathy for the victorious faith and strong personality of King Olaf. It was Oehlenschläger's conviction that the best thing to do for Danish poetry was to give new life to the literature of the Eddas and the Sagas, and that he could do it. After the production of this tragedy, in 1808, all agreed with him. It is true that the rhetorical eloquence of Hakon does not fit the heroes of saga times, when swords spoke the most and the loudest, and that the saga heroes as depicted by Bjornson and Ibsen are much more true to life. But we are impressed by the beauty, the poetical power and wealth of ‘Hakon Jarl,’ as it pictures the conflict between Paganism and Christianity, between Hakon and Olaf. It was a great advance beyond any historical drama produced before in Scandinavian literature. There is an English translation by J. C. Lindberg, University Studies (Nebraska).

GISLE BOTHNE.

HALAKAH, hā-lä′kạ (from Heb. חלך, halak, to go), the legal part of Hebrew tradition. The term is used to connote all the laws, both civil and religious, which derive their sanction from custom rather than from the sacred Scriptures. “Midrash halakah” is the term used to cover the disputations, interpretations, etc., concerning the legal part of the Scriptures. At first handed down orally, the laws came to be written, and were modified and improved by successive editors and commentators.

HALBE, hal′bē, **Max,** German dramatist: b. Guettland, near Danzig, 4 Oct. 1865, of an old family of peasants who had immigrated two centuries earlier from Westphalia. He attended the gymnasium at Marienburg, and the universities of Heidelberg (where he studied law, 1883), Munich (1884), and Berlin (1885–87), where he studied history and Germanic philology. In both the latter cities he became acquainted with the leaders of the new naturalistic movement in German literature, and was associated with the *Freie Bühne* (Free Stage) Movement in 1889. He was strongly influenced by the association with, and the works of Johannes Schlaf and Arno Holz (q.v.), and in the spring of 1890 wrote the play 'Freie Liebe' (Free Love). He married the same year. Halbe was not entirely in accord with the *Freie Bühne,* and with consistent naturalism (see HAUPTMANN, GERHART), as the latter deviated considerably from his own tendencies. Accordingly it was difficult for him to place 'Eisgang' (1892) and 'Jugend' (1893) on the stage, although the latter did have a performance on the Freie Volksbühne in 1892. 'Jugend' was especially difficult to place; famous theatre managers in Berlin (L'Arronge, Barnay, Blumenthal) refused it, but Lautenburg accepted and performed it with great success in 1893. Theatregoers considered Halbe as having displaced Hauptmann in the primacy of contemporary German drama. But the theatrical public of Berlin is very fickle and requires a succession of favorable impressions, and when Halbe's next play, the comedy 'Der Amerikafahrer' ('The Tourist in America'), made the impression of being witless, his reputation rapidly declined. Constant laments were uttered by critics, as to his failure to fulfill the promise of his early work. Halbe decided to absent himself from the hothouse atmosphere of literature in the capital, and settled in the country at Kreuzlingen, on Lake Constance, in 1894. In 1895 he settled in Munich, where he again began to write; the dramas 'Lebenswende' and 'Mutter Erde' (the latter and 'Jugend' are his most famous works) and the "novelle" 'Frau Mesek' are of this period. In 1895, together with Ruederer, Halbe founded the Intimate Theatre at Munich in which writers and poets appeared on the stage. Among the other members of this circle were Hartleben, Hirschfeld, Wedekind, Gumppenberg, Karl Hauptmann, Ludwig Thoma and Count Keyserling. A complete list of his dramas includes 'Ein Emporkömmling' (1889); 'Freie Liebe' (1890, later called 'Ein Verhältnis,' 1895); 'Eisgang' (1892); 'Jugend' (1893); 'Der Amerikafahrer' (1894); 'Lebenswende' (1896); 'Mutter Erde' (1897); 'Der Eroberer' (1898); 'Die Heimatlosen' (1899); 'Das Tausendjährige Reich' (1899); 'Hans Rosenhagen' (1901); 'Walpurgistag' (1902); 'Der Strom' (1903); 'Die Insel der Seligen' (1905); 'Das wahre Gesicht' (1907); 'Blaue Berge' (1909); 'Der Ring des Gauklers' (1912). Of 'Mutter Erde,' a translation into English, 'Mother Earth,' appeared in 'German Classics' (Vol. XX, New York 1914). Consult Elsner, Richard, 'Moderne Dramatik in kritischer Beleuchtung' (Berlin 1908); Stern, Adolf, 'Studien zur Literatur der Gegenwart' (Berlin 1905); Glaser, J., 'Max Halbe' (in *Nord und Süd,* 1889).

JACOB WITTMER HARTMANN.

HALBIG, Johann, yō'hän häl'bĭg, German sculptor: b. Donnersdorf, Lower Franconia, 13 July 1814; d. Munich, 29 Aug. 1882. He studied at the Munich Academy, and elsewhere, finally establishing himself at Munich, where he became a professor in the Polytechnic School in 1845. His most important work is the quadriga with four colossal lions for the triumphal gateway, Munich. He also executed the Platen memorial at Ansbach, the bronze statue of Fraunhofer at Munich, the 'Emancipation' group in New York, the 'Crucifixion' group for Oberammergau, and numerous busts.

HALDANE, James Alexander, Scottish clergyman and author: b. Dundee, 14 July 1768; d. Edinburgh, 8 Feb. 1851. He studied at Edinburgh University, and in 1785 became a midshipman and spent nine years on the sea. Settling at Edinburgh he began to devote himself to religious work, and as an independent lay preacher toured Scotland. In 1797 he founded the Society for Propagating the Gospel at Home, whose efforts took the form of lay preaching and tract distribution. Two years later, with his brother, Robert Haldane (q.v.), he established the first Congregational church in Scotland, of which he was the first pastor. In 1801 he became preacher at the tabernacle at Leith Walk. His conformation to Baptist theories in 1808 involved him in serious controversies. He published many treatises of controversial literature, notably against the Rev. William Jones, a Baptist minister; against the Walkerites; Erskine of Linlathen; the Baptist Midland Association; and against Doctors Ward and Jenkyn. Of a more literary character are his 'Journal of a Tour to the North'; 'Early Instruction Commended in a Narrative of Catherine Haldane, with an Address to Parents on the Importance of Religion'; 'Views of the Social Worship of the First Churches' (1805); 'The Doctrine and Duty of Self-Examination' (1806); and 'An Exposition of the Epistle to the Galatians' (1848). He was also editor of the *Scripture Magazine.* Consult the 'Life' by Alexander Haldane (London 1852).

HALDANE, Robert, Scottish preacher: b. London, 28 Feb. 1764; d. Edinburgh, 12 Dec. 1842. He was the brother of James Alexander Haldane (q.v.), and was likewise sent to Edinburgh to study. His fondness for the sea caused his stay at the university to be very short. He entered the naval service in 1780, remaining for three years, when he returned, resumed his studies at Edinburgh and finally settled down at his estate in Airthrey. At first he took a deep interest in political reform, and was greatly inspired by the French Revolution. Religious interests soon began to predominate in his life. Accordingly, he advanced a project for missionary work in India which was turned down by the East India Company. He therefore decided to do missionary work in Scotland. He assisted his brother in founding the Congregational church at Edinburgh, established tabernacles, provided for the education of prospective pastors; put forth a scheme for educating some African children in England; and was exceedingly active in stimulating religious interest in Scotland. His adoption of Baptist views alienated his former co-religionists, and he went abroad to work on the Continent. For a number of years he was active in Switzerland and southern France, and in 1817 carried on his evangelistic work at Montauban. In 1819 he returned to his native land. He participated in several controversies and wrote 'The Evidence and Authority of Divine Revelation' (1816); 'The Books of the Old and New Testament Proved to be Canonical' (1830); 'Exposition of Romans' (1835). His life has been written by Alexander Haldane (1852).

HALDANE OF CLOAN, 1st VISCOUNT, British lawyer and statesman: b. Perthshire, 30 July 1856. Richard Burdon Haldane was educated at Edinburgh Academy and the universities of Edinburgh and Göttingen. Before he went abroad to continue his studies he had taken his M.A. degree and 1st class honors in philosophy: he had won the Gray Scholarship, the Ferguson Scholarship of the four Scottish universities and the Bruce of Grangehill medal. At Göttingen he studied metaphysics under Professor Lotze. Returning to England, he took up law, was called to the Chancery Bar in 1879, became queen's counsel in 1890, and a bencher of Lincoln's Inn in 1893. His political career began in 1885, when he was elected Liberal M.P. for Haddingtonshire, Scotland. Mr. Haldane had to wait nearly 21 years before his services could be rewarded with an office, and then he directly stepped into one of the most important positions under the Crown, namely, Secretary of State for War, to which he was nominated by the new Premier, Sir Henry Campbell-Bannerman, in December 1905. Considerable surprise was expressed at the choice of a lawyer and philosopher to take over the administration of the army, which, for some inscrutable reason, had long been reputed an inefficient and neglected organization. The inefficiency referred to did not lie with the soldiers, whether regulars or volunteers, but with the civilian heads of the War Office; so rampant and notorious, indeed, was this evil that "War Office" and "Muddle" were popularly regarded as synonymous terms. Prominent British soldiers, politicians, civilians and newspapers had for many years vainly clamored for a strong and efficient army, pointing to Britain's modern wars as painful examples of "muddling through," the army being in no case prepared for the task expected of it. So far as the regulars were concerned, there was no finer body of professional soldiers in any country, for the men were encouraged to remain and serve 21 years and retire on pensions instead of, as is especially the custom with the rank and file of conscript armies, returning to civil life on completing their short obligatory active service. Outside of the regulars, Great Britain possessed a civilian army of about 250,000 young men, "volunteers," who did their soldiering in such time as they could spare from their work. They paid their own expenses and received little or no assistance from the government; their officers were for the most part retired regulars, but there was no official minimum of drill. Together with the yeomanry they constituted a peace army, ill-suited and ill-equipped for war. No practical steps were taken to utilize this valuable material till Mr. Haldane became Secretary for War. Yet the volunteers were, on occasion, more than "Saturday Afternoon Soldiers"— as they were often derisively termed. Large numbers offered their services and fought in the Egyptian and South African wars. Mr. Haldane set himself to reorganize the whole force by co-ordinating the volunteers, militia and yeomanry with the regulars. In 1907 he introduced the Territorial Forces Act, "by which all the volunteers were changed into territorials or second-line troops, drilled, administered and financed by the army authorities. The loose, haphazard system of "membership" was replaced by a four-years' enlistment, and cavalry and artillery were added — which the old régime lacked. Curiously enough, while many military and civil personages bestowed praise upon the scheme and labored with the county associations to make it a success, there were not a few who condemned the innovation and prophesied its failure. Even the veteran Lord Roberts assailed it as being only a half-measure, totally inadequate for a great emergency — which he foretold years before 1914. The critics were right in their way; on behalf of the War Minister it must be acknowledged, however, that he did the best that was possible with the material at his hands — under voluntary enlistment. He also initiated the "Officers Training Corps" from the university cadets; he made the general staff a power in the army and throughout the empire; he perfected the expeditionary force and backed it with a special reserve; above all, he restored public confidence in the War Office. In 1911 he was created Viscount, and in 1912 he succeeded Lord Loreburn as Lord High Chancellor of England, thus crowning a legal career which began with his call to the bar 36 years earlier. Although he was the object of much criticism as War Minister, Lord Haldane's high judicial qualifications were indisputable. After the outbreak of the European War a strong volume of public opinion turned against him. Years before he had committed the indiscretion of describing Germany as his "spiritual home," and had on numerous occasions publicly lauded German philosophy, education and national efficiency. Moreover, he had been a personal friend of the Kaiser; he had made numerous official and unofficial visits to Berlin, and had acted as the British agent in negotiations with the German government relating to the "Naval Holiday" scheme. Almost amusing was the torrent of abuse poured upon Lord Haldane in certain sections of the British press for his alleged pro-Germanism, while simultaneously the German press abused him still more violently as a "treacherous friend." On the formation of Mr. Asquith's Coalition Cabinet in May 1915 Lord Haldane resigned his office and was decorated with the Order of Merit by the king. He published 'Essays in Philosophical Criticism'; 'Life of Adam Smith'; a translation (with Mr. Kemp) of Schopenhauer's 'World as Will and Idea'; 'Education and Empire'; 'The Pathway to Reality.' See GREAT BRITAIN — ARMY.

HALDEMAN, hâl'dĕ-mạn, **Samuel Stehman**, American naturalist: b. Locust Grove, Pa., 12 Aug. 1812; d. Chickies, Pa., 10 Sept. 1880. He was educated at Dickinson College, Pa., was professor of natural sciences at the University of Pennsylvania in 1851–55; and of comparative philology there 1869–80. He published 'Fresh Water Univalve Mollusca of the United States' (1840); 'Zoological Contributions' (1842–43); 'Elements of Latin Pronunciation' (1851); 'Affixes in Their Origin and Application' (1865); 'Pennsylvania Dutch' (1872); 'Outlines of Etymology' (1877); 'Analytic Orthography' (1858), etc.

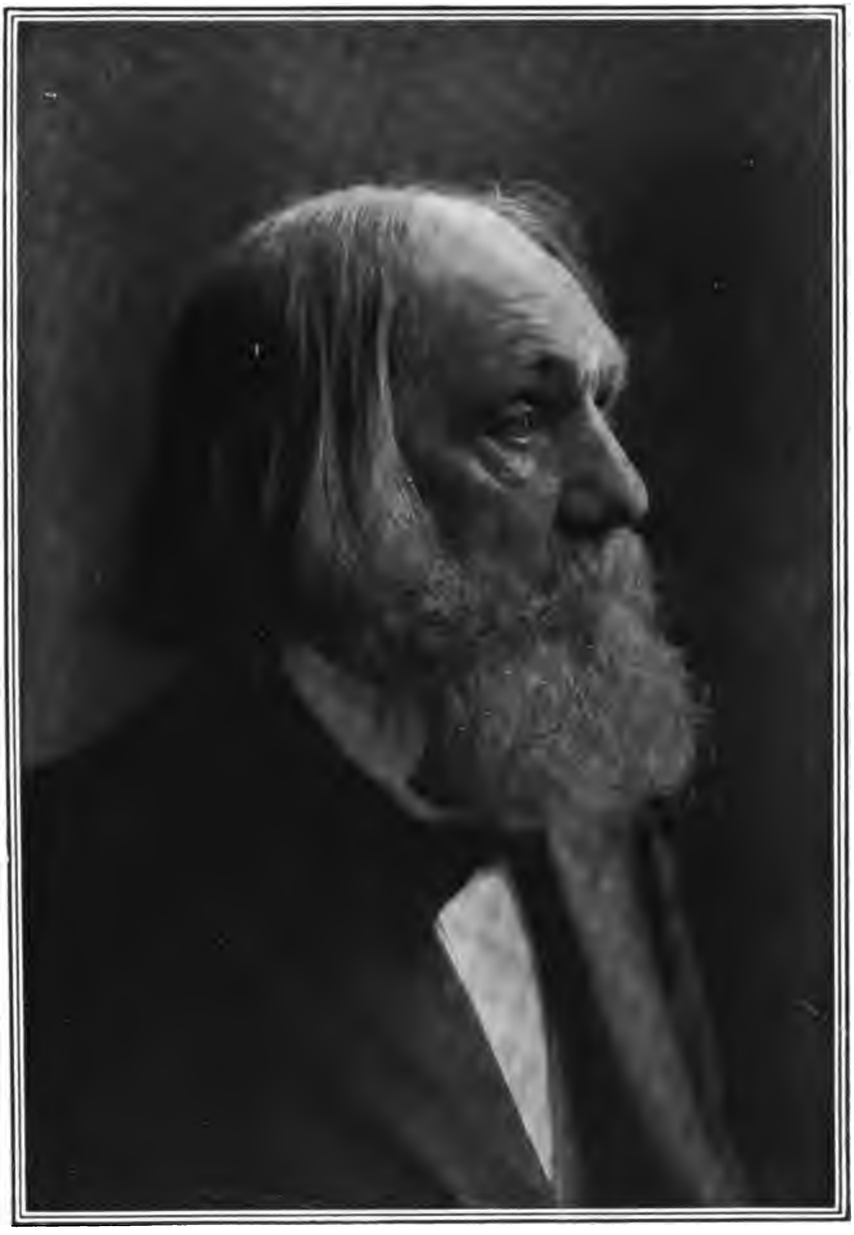
HALDIMAND, SIR **Frederick**, Swiss soldier in the English service: b. Canton of Neuchâtel, Switzerland, October 1718; d. Yverdun, Switzerland, 5 June 1791. He served in the army of Sardinia and later became a member of the Swiss guard at The Hague, and was there stationed when with Henry Bouquet (q.v.) he enlisted in 1756 in the British army for service in America. He organized, largely from

Pennsylvania, a regiment composed of Swiss, Germans and others and known as the “Royal Americans,” and became its commander. In 1759 he won distinction by his successful defense of Oswego against the attack of 4,000 French and Indians, and in 1767–78 held the chief command in Florida. From 1778 to 1786 he was governor-in-chief of Canada, severely repressed Canadian sympathy with the Revolution and rendered conspicuous service in the settlement of the Loyalist refugees. His valuable official correspondence is in the possession of the British Museum and copies are in the Dominion archives at Ottawa. Consult McIlwraith, ‘Sir Frederick Haldimand’ (1904).

HALE, Edward Everett, American Unitarian clergyman and author: b. Boston, Mass., 3 April 1822; d. 10 June 1909. His father was Nathan Hale (q.v.), the first editor of the Boston *Daily Advertiser,* and the son was educated at the Boston Latin School and Harvard College. Later he studied theology and was pastor of the Church of the Unity, Worcester, Mass., 1846–56. He then became pastor of the South Congregational Society in Boston, a Unitarian Church, and was its pastor emeritus from 1901 until his demise. In the Unitarian body he was long one of its foremost men, of a radical rather than a conservative type, while yet strongly loyal to the Unitarian faith. As a preacher he was always popular, and his talents for organization bore fruit in such humanitarian societies as the Harry Wadsworth Clubs, King's Daughters, Look Up Legions, and others. For several years he edited *Old and New,* a magazine afterward merged in *Scribner's Monthly,* and has edited *Lend a Hand,* a journal of organized charity, since 1886. After his retirement from active pastoral work he was active in various denominational and other religious and social enterprises, and lectured at frequent intervals. His 80th birthday was celebrated by a gathering in Symphony Hall, Boston, composed of representative persons from all denominations in his native city, as well as of civic and state officials, assembled to testify to the regard in which he was held, irrespective of creed or race. To Americans in general, however, he is best known as an author, and in spite of his countless clerical labors he has been one of the most voluminous of American writers. Much of his work is from necessity ephemeral in its nature, but when he had consciously wrought with an artistic end in view his level of attainment has been high. His short story, ‘The Man Without a Country,’ has long been accounted an American classic, and even more skilful in construction and perfect in finish was ‘My Double and How he Undid Me’; ‘In His Name’ has been almost equally popular. In extravaganza like ‘The Brick Moon,’ such an absolute air of verisimilitude is preserved that the absurdest conceptions of the tale appear more than half credible. ‘The Man Without a Country’ was indeed accepted as a record of fact by many readers on its first appearance in 1863, although the theme is in its conception most improbable, and its author was obliged to state at a later date that it had no foundation in fact. The list of his published works is a long one, including nearly 70 titles, and besides those already named may be cited ‘Margaret Percival in America’ (1850); ‘Elements of Christian Doctrine’ (1860); ‘If, Yes, and Perhaps’ (1868); ‘Sybaris and Other Homes’ (1869); ‘The Ingham Papers’ (1869); ‘His Level Best and Other Stories’ (1872); ‘Philip Nolan's Friends’ (1876); ‘The Fortunes of Rachel’ (1884); ‘Boys' Heroes’ (1886); ‘Life of George Washington Studied Anew’ (1887); ‘They Saw a Great Light’ (1889); ‘The Story of Christopher Columbus’ (1891); ‘The Story of Massachusetts’ (1891); ‘The New Harry and Lucy’ (1892); ‘East and West or the New Ohio’ (1892); ‘A New England Boyhood’ (1893); ‘Fifty Years: Poems’ (1893); ‘If Jesus Came to Boston’ (1894); ‘Susan's Escort’ (1895); ‘Historic Boston’ (1898); ‘Lowell and His Friends’ (1899); ‘Memories of a Hundred Years’ (1900). With his sister Susan Hale he wrote a series of travel books entitled ‘Family Flights through France, Germany, etc.,’ and he also edited numerous volumes from ‘The Rosary’ (1848) to ‘Unpublished Essays of Emerson’ (1895). See MAN WITHOUT A COUNTRY, THE.

HALE, Edward Everett, Jr., American author and educator, son of Edward Everett Hale (q.v.): b. Boston, 18 Feb. 1863. He was graduated at Harvard University in 1883 and subsequently studied at the University of Halle, from which he received the degree of D.Ph. in 1892. In 1886–90 he was instructor and assistant professor of English at Cornell University; in 1890–92, while abroad, held the Harris Fellowship of Harvard University, and in 1892–95 was professor of English at the University of Iowa. Since 1895 he has been professor at Union College, Schenectady, N. Y., first of rhetoric and later of English. Professor Hale has edited a number of school and college texts and from 1893 to 1917 was a contributor to the *Dial.* He is a contributor to the ‘Encyclopedia Americana’ and is author of ‘Constructive Rhetoric’ (1896); ‘James Russell Lowell’ (1899); ‘Dramatists of To-Day’ (1905, 6th ed., 1911); ‘William H. Seward’ (1910); and ‘Life and Letters of Edward Everett Hale’ (1917).

HALE, Eugene, American politician: b. Turner, Oxford County, Me., 9 June 1836; d. Washington, D. C., 27 Oct., 1918. After study of law he was admitted to the bar in 1857, began practice at Ellsworth, Me., and was a member of the Maine legislature in 1867, 1868 and 1880. In 1868 he was elected representative to Congress, and in that capacity served until 1878, acting on the committee on appropriations, and during his last term being chairman of the Republican congressional committee. In 1868, 1876 and 1880 he was a delegate to the Republican national conventions of those years, in 1874 was offered the post of postmaster-general and in 1877 that of secretary of the navy, but declined both. He was a member of Grant's commission appointed for canvass of the Louisiana presidential vote in 1876. He succeeded Hannibal Hamlin in the United States Senate in 1881, and was re-elected in 1887, 1893, 1899, 1905, and 1909. He retired in 1911 after serving as majority leader of the Senate. In the Senate he became known as a Republican leader, interesting as a speaker and skilful in matters of legislative routine.



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EDWARD EVERETT HALE

HALE, George Ellery, American astronomer: b. Chicago, 29 June 1868. He was graduated at the Massachusetts Institute of Technology in 1890; studied at Harvard College Observatory, 1889–90; University of Berlin, winter, 1893–94; (honorary Sc.D. University of Pittsburgh 1897, Yale 1905, Victoria University, Manchester, 1907, Oxford 1909, Cambridge 1911; LL.D. Beloit 1904, University of California 1912; honorary Ph.D. Berlin 1910). He was director of the Kenwood Astrophysical Observatory, 1890–96; associate professor of astrophysics, 1892–97, professor, 1897–1905, and director of Yerkes Observatory, 1895–1905; is now director of the Solar Observatory of the Carnegie Institution of Washington at Mount Wilson, Cal. He is the inventor of the spectroheliograph, an instrument for photographing the solar prominences and other solar phenomena. His principal scientific researches have been made in solar and stellar spectroscopy. He was joint editor of *Astronomy and Astrophysics,* 1892–95, and the *Astrophysical Journal* since 1895. He has written many papers on the sun, stellar spectroscopy, etc., and was awarded the Janssen Medal, Paris Academy of Sciences, 1894; the Rumford Medal, 1902; the Draper Medal, 1903; Gold Medal, Royal Astronomical Society, 1904; and the Bruce Medal, 1916. He is foreign member of the Royal Society of London, Accademia dei Lincei, Rome; Amsterdam Academy of Sciences; corresponding member of the Institut de France; honorary member of the Vienna Academy of Sciences; foreign associate of the Royal Astronomical Society; honorary member of the Royal Society, Upsala, and many others.

HALE, Horatio, American ethnologist: b. Newport, N. H., 3 May 1817; d. Clinton, Ontario, 29 Dec. 1896. He was a son of Sarah J. Hale (q.v.). He was graduated from Harvard in 1837 and the next year was appointed philologist to the government exploring expedition under Captain Wilkes, and was thus enabled to study the languages of the Pacific Islands, North and South America, Australia, and Africa. The results of his observations were published in 'Ethnography and Philology' (1846). He then studied law, was admitted to the Chicago bar, and removing to Canada in 1855 practised law at Clinton. His other works are 'Indian Migrations as Evidenced by Language' (1883); 'The Iroquois Book of Rites' (1883); 'A Report on Blackfoot Tribes' (1885). He was classed among the foremost philologists of his time and was a member of learned societies at home and abroad.

HALE, Irving, American soldier and electrician: b. North Bloomfield, N. Y., 28 Aug. 1861. He removed with his parents to Colorado in 1865, crossing the plains by wagon and team, the family making their first settlement at Central City, where the boy attended the public school of which his father was principal. Later the family removed to Denver, where he attended the high school, graduating in June 1877, the youngest and highest in his class. He entered United States Military Academy, West Point, 1880, and was graduated in 1884, first in his class. He was assigned to the Corps of Engineers. In 1888 he took part in the Division of Atlantic Rifle Competition, winning first gold and first skirmish medals. That year he was sent to the United States Military Academy as instructor in civil and military engineering. On 1 April 1890, he resigned from the army and has since been connected with the Edison General Electric Company, later the General Electric Company, and is manager of the Rocky Mountain District (six States), with headquarters at Denver. He served with the National Guard of Colorado as lieutenant-colonel, colonel and brigadier-general. At the outbreak of the Spanish-American War he was commissioned colonel of the First Colorado Infantry, United States Volunteers, was promoted brigadier-general "for gallant and distinguished services, etc. . . . in the capturing of Manila, 13 Aug. 1898," recommended for promotion to major-general by brevet for "gallant and meritorious services throughout the campaign against Filipino insurgents from 4 February to 5 July, 1899: particularly for skill, zeal and courage in conducting the operations of his brigade in the movements from Malolos to Calumpit, Island of Luzon, 23 to 27 April 1899." On 1 Oct. 1899 he was honorably discharged from the Volunteer Service. He received the honorary degree of Electrical Engineer from the Colorado State School of Mines in 1897, and that of LL.D. from the University of Colorado in 1899. He is a member of various military and scientific societies and has written papers and delivered lectures on many scientific subjects.

HALE, John Parker, American legislator and diplomat: b. Rochester, N. H., 31 March 1806; d. Dover, N. H., 19 Nov. 1873. After graduation from Bowdoin in 1827 and study of the law at Rochester and Dover, he was admitted to the bar in 1830, in 1832 was elected a Democratic representative in the State legislature, and in 1834–41 was United States District Attorney. In 1842 he was elected to Congress, where, though remaining a Democrat, he stoutly opposed the "gag-rule" which sought the exclusion of anti-slavery petitions. He was renominated; but previous to the election the annexation of Texas was made a plank of the Democratic platform, and the State legislature of New Hampshire directed its congressmen and senators to support the measure. Hale in a public statement refused to do this and the Democratic State Convention was then reassembled and his name stricken from the ticket. Hale ran as an independent Democrat, but no candidate received a majority. In 1846, after a spirited canvass known as the "Hale storm of 1845," he was elected to the lower house of the legislature, and became its speaker. In 1847 he was elected to the United States Senate, where he was the first, and, until joined by Salmon P. Chase in 1849, the only avowed anti-slavery member. He was an orator of fine abilities, and besides opposing the slave system, secured laws abolishing flogging and grog-ration in the navy. He was nominated for president by the Free-Soil Democrats in 1852, and received 157,685 votes. In 1855 he was elected to the Senate for the four years of the unexpired term of C. G. Atherton, deceased, and in 1858 for a full term. During the Civil War he supported the Lincoln administration. He was United States minister to Spain in 1865–69.

HALE, Ledyard Park, American lawyer: b. Canton, Saint Lawrence County, N. Y., 17 May 1854. He received his education at Saint Lawrence University and at the University of Wisconsin. From 1882–88 he was assistant district attorney of Saint Lawrence County, becoming district attorney in 1894. In 1903 he was elected county judge, which office he held until 1908, since when he has been counsel to the Public Service Commission of the second district. From 1907–08 he served as commissioner of the State Board of Charities under Governor Hughes.

HALE, Lucretia Peabody, American author, sister of E. E. Hale (q.v.): b. Boston, Mass., 2 Sept. 1820; d. there 12 June 1900. She was very popular as a writer for young people, and in addition to 'The Lord's Supper and Its Observance' (1866); 'The Service of Sorrow' (1867); 'The Wolf at the Door' in the 'No Name Series' (1877), she published for young readers 'The Peterkin Papers' (1882); and 'The Last of the Peterkins' (1886). She also wrote 'The New Harry and Lucy' (with E. E. Hale). She will be longest remembered as the creator of the Peterkin Family, who have become widely recognized types of character.

HALE, Sir Matthew, English jurist: b. Alderley, Gloucestershire, 1 Nov. 1609; d. there, 25 Dec. 1676. He was educated at Oxford and Lincoln's Inn, and is said to have studied 16 hours daily, extending his researches to natural philosophy, mathematics, history and divinity, as well as the sciences more immediately connected with his profession. He was a most prodigious worker for many years laying out for himself a schedule covering 16 hours daily. He was called to the bar before the commencement of the civil war: and in the conflict of parties which took place his moderation, accompanied as it was by personal integrity and skill in his profession, secured him the esteem of both royalists and parliamentarians in his own time. In 1654 he became a judge of the Common-bench (the former King's-bench), in which station he displayed firmness of principle sufficient to give offense to the Protector. He was a member of the Parliament which restored Charles II, and one of the members most active in passing the Act of Indemnity. In 1660 he was knighted, and made chief baron of the Court of Exchequer. He was the last English judge who sanctioned the conviction of culprits for witchcraft. He was raised to the chief-justiceship of the King's-bench in 1671. After his death appeared his 'History of the Pleas of the Crown'; 'Jurisdiction of the Lords' House'; and 'The History of the Common Law of England.' He also wrote several works on scientific and religious subjects.

HALE, Nathan, American revolutionary officer: b. Coventry, Conn., 6 June 1755; d. New York, 22 Sept. 1776. He was graduated at Yale in 1773, and engaged as a teacher, first at East Haddam, and afterward at New London. His parents intended him for the ministry; but on the Lexington alarm in 1775 he wrote to his father, in a Connecticut regiment, saying "that a sense of duty urged him to sacrifice every thing for his country," and soon after entered the army as lieutenant (1775) and in a few months was promoted to be captain (1776). While with the troops near Boston he was vigilant and faithful in every point of duty; and according to a tradition of doubtful authenticity, in September 1776, when in New York, he, with an associate, planned and effected the capture of a British sloop laden with provisions, taking her at midnight from under the guns of the man-of-war Asia, and distributing her prize goods to the American soldiers. After the retreat of the army from Long Island, when it was all-important to understand the plans of the enemy, Washington applied for a discreet and practised officer to enter the enemy's lines and procure intelligence, and Hale volunteered for the service. He passed in the disguise of a Dutch schoolmaster to the British camp and made full drawings and memoranda of all the desired information, but on his return was apprehended and taken before Howe, by whom he was ordered to execution the next morning. He was denied a Bible and the aid of a clergyman; and was hanged, saying with his last breath: "I only regret that I have but one life to lose for my country." A statue of Hale by Macmonnies is in City Hall Park, New York, and one by Gerhardt in Hartford, Conn. Consult the 'Life' by Johnston (1901); Holloway, 'Nathan Hale, the Martyr Hero' (1899); Partridge, 'Nathan Hale, the Ideal Patriot' (1902).

HALE, Nathan, American journalist: b. West Hampton, Mass., 16 Aug. 1784; d. Brookline, Mass., 9. Feb. 1863. He was a nephew of the patriot Nathan Hale (q.v.) and father of Edward Everett Hale (q.v.). He was graduated from Williams College in 1804, and after studying law was admitted to the Boston bar in 1810, in 1811–14 was editor of the Boston *Weekly Messenger*, and in 1814 purchased and became editor of the *Advertiser*, established in 1813 and the first New England daily. At first Federalist in politics, the *Advertiser* became successively Whig and Republican and was at all times very influential. In 1820 it opposed the Missouri bill, in 1854 the Kansas-Nebraska bill, and it was the first newspaper to advocate the settlement of Kansas by "Free-Soil" colonists. Hale was a founder of the *North American Review* (1815), served at various times in both houses of the Massachusetts legislature, published a series of stereotyped maps after a method invented by himself (1830), and wrote pamphlets on topics of internal improvement.

HALE, Philip, American music critic: b. Norwich, Vt., 5 March 1854. Graduated from Yale in 1876, he was admitted to the bar in Albany (1879), studied music under Dudley Buck and later in Europe with Haupt, Bargiel and Guilmant (1885–87), and was organist successively of Saint Peter's, Albany (1879–82), Saint John's, Troy (1887–89), and the First Unitarian Society of Roxbury, Mass. (1889–1905). In 1889–97 he contributed music criticism to the Boston press, (1891–1903) was critic of the *Journal*, in 1897 became editor of the *Musical Record*, and in 1901 of the *Musical World*. He has been dramatic and music critic of the *Boston Herald* since 1903, editor of the Boston Symphony Program Books since 1901. He is known as one of the most discriminating and interesting of American writers on musical subjects.

HALE, Salma, American politician: b. Alstead, Cheshire County, N. H., 7 March 1787; d. Somerville, Mass., 19 Nov. 1866. He was early apprenticed to a printer of Walpole, N. H., in 1805 became editor of the *Political Observer,* a Republican journal of Walpole, held various local offices, and in 1828 and 1844 was a member of the New Hampshire house of representatives, and in 1824 and 1845 of the State senate. In 1845 he was appointed secretary of the commission for the determination of the Northeastern boundary line of the United States. He was elected to Congress in 1816 as a Republican (Democratic) representative, but declined a re-election. His 'History of the United States' (1821) won a prize of $400 and a gold medal, offered by the American Academy of Belles-Lettres, and appeared in many subsequent editions. He published also 'The Administration of J. Q. Adams' (1826); and 'Annals of the Town of Keene' (1826).

HALE, Sarah Josepha Bell, American author and editor: b. Newport, N. H., 24 Oct. 1788; d. Philadelphia, 30 April 1879. Her husband dying in 1822 leaving her with five small children, she supported her family by literary work. She was editor of the Boston *Ladies' Magazine* 1828–37, and when in 1837 this was consolidated with *Godey's Lady's Book,* published in Philadelphia, she became editor of the latter also, continuing in the position for 40 years. She retired from literary life in 1877. Her efforts in behalf of the Bunker Hill Monument fund, her interest in seamen, in foreign missions and in the higher education of women, were untiring and successful. For many years she advocated the keeping of Thanksgiving Day as a national festival, as it had been observed since 1864, when President Lincoln adopted her suggestion. Her most enduring publication is 'Woman's Record; or Sketches of All Distinguished Women' (New York 1874).

HALE, William Bayard, American writer: b. Richmond, Ind., 6 April 1869. He was graduated from Harvard and the Episcopal Theological School (Cambridge, Mass.), and was rector at Middleborough, Mass., 1892–99, and subsequently at Ardmore, Pa., retiring from the ministry in 1901. He has published 'The Making of the American Constitution'; 'The Eternal Teacher' (1895); 'The New Obedience' (1898); 'Phillips Brooks'; 'A Week in the White House with Theodore Roosevelt' (1908); 'Woodrow Wilson — the Story of His Life' (1912); 'American Rights and British Pretensions on the Seas' (1915). As an editor he served on the *Cosmopolitan* (1900), *Philadelphia Public Ledger* (1903–07), New York *Times,* as an editor of the supplement of Book Reviews (1906–08). Then he went to Paris for the New York *Times,* and later was on the staff of *World's Work.*

HALE, William Thomas, American writer: b. Liberty, Tenn., 1 Feb. 1857. He practised law for several years, and has since been connected editorially with Saint Louis, Nashville, Memphis and Knoxville dailies; is a frequent contributor to magazines; and his writings for the newspaper press would fill many volumes. A number of his lyrics have been given musical settings by prominent composers. He has published 'Poems and Dialect Pieces' (1894); 'Showers and Sunshine,' verse (1896); 'The Backward Trail: Stories of the Indians and Tennessee Pioneers' (1899); 'An Autumn Lane and Other Poems' (1899); 'Great Southerners' (1900); 'True Stories of Jamestown, Virginia' (1907); 'A History of Tennessee and Tennesseans,' (8 vols., 1914); 'A History of De Kalb County, Tennessee' (1915).

HALES, Alfred Arthur Greenwood, Australian novelist and journalist: b. Kent Town, Adelaide, 20 July 1870. He was special correspondent during the South African War for the *London Daily News* and he served as an officer in the insurgent army in Macedonia against the Turks in 1903. His articles on Macedonia published in the London press were translated into Bulgarian and used as a textbook by order of the Minister of Education. He was also correspondent for the *Daily News* during the first part of the Russo-Japanese War. He is known in Australia, England, United States, Canada and South Africa as a lecturer. In addition to much material which appeared in newspapers and magazines and consisted of songs, poems and short stories, he has written on mining, agriculture and the problems connected therewith. He has been upon nearly all the well-known mining fields of the world. In the investigation and study of mining, pastoral and agricultural problems and possibilities, he spent three years in South Africa alone. Among his numerous published works are 'McGlusky'; 'Camp Fire Sketches'; 'Campaign Picture'; 'Driscoll King of Scouts'; 'Jair the Apostate'; 'Angel Jim'; 'Molly Micheldene'; 'Little Blue Pigeon'; 'The Watcher on the Tower'; 'The Viking Strain'; 'Poems and Ballads'; 'The Wanderings of a Simple Child'; 'Maid Molly'; 'A Lindsay of the Dale'; 'The Great Betrayal'; 'McGlusky the Reformer'; 'Peter Jackson,' and 'Morozla' Among his numerous dramas and short plays are 'The Warrior Priest'; 'The Last Man Out'; 'A Wrecker of Hearts'; 'The Crimson Passion Flower'; 'The Surprise Packet'; 'Foiled bv a Woman'; 'The Jakaroo'; 'May Yohé'; 'A Woman Worth Sinning for'; 'The Career of McGlusky' (1917); 'McGlusky's Great Adventure' (1917).

HALÉVY, Jacques François Fromental Elie, zhäk frän-swä frō-mŏṅ-täl ā-lē ä-lā-vē, French composer: b. of Jewish parentage, Paris, 27 May 1799; d. Nice, France, 17 March 1862. He studied counterpoint under Cherubini for five years, and in 1819 was sent to Italy to finish his education. The first of his pieces performed was a little comic opera, 'L'artisan,' given at the Théâtre Feydau, in 1827. His *chef-d'œuvre,* 'La Juive,' appeared in 1835 and rapidly obtained a European celebrity, and has been frequently sung in the United States. Among his other works are 'L'Eclair'; 'Guido et Ginevra'; 'La Reine de Chypre'; 'Le Val d'Andorre'; 'La Fée aux Roses.' The melodies of Halévy are always soft and flowing, the harmony correct and pleasing; but his works display on the whole more talent than genius. Consult the 'Life' by Léon Halévy (1863).

HALÉVY, Joseph, zhō-zĕf, French Orientalist and traveler: b. Adrianople, Turkey, 15 Dec. 1827. He traveled in Abyssinia; and for the Académie des Inscriptions he traversed Yemen, where he obtained copies of not less than 686 inscriptions, largely Himyaretic and Sabæan. He was appointed assistant librarian of the Asiatic Society and adjunct-professor of Ethiopic in the École des Hautes Etudes. Well known also as a biblical critic and Assyriologist, he founded (1893) the ‘Revue Sémitique d'Epigraphie et d'Histoire Ancienne,’ and published numerous works, including ‘Archæologic Mission to Yemen’ (1872); ‘Journey to Nedjran’ (1873); ‘Sabæan Studies’ (1875); ‘The Origin of Babylonian Civilization’ (1876); ‘Miscellany of Criticism and History Regarding Semitic Peoples’ (1883); ‘Summary of Assyrio-Babylonian Signs and Inscriptions’ (1912).

HALÉVY, Ludovic, lü-dō-vēk, French dramatist and novelist: b. Paris, France, 1 Jan. 1834; d. there, 8 May 1908. He was unsuccessful at first, but finally worked his way into public favor, especially after associating his pen with that of Henri Meilhac. In collaboration with the latter, he wrote many of the librettos of Offenbach's most brilliant and satiric operettas, including ‘The Perichole,’ ‘The Brigands,’ the ‘Belle Hélène,’ and ‘The Grand Duchess of Gérolstein.’ Several serious librettos of high excellence are from the same hands, including that for Bizet's ‘Carmen.’ In spoken drama, ‘Frou-Frou’ and ‘Tricoche and Cacolet’ are among the most popular plays the two dramatists produced together. In 1881 he ceased writing for the stage, and turned to fiction. ‘L'Abbé Constantin,’ the first of his novels, is also the most popular, and opened to him the French Academy in 1884. It was for more than one season the French story of the day. It is a charming story, full of fresh air and sun, simply and skilfully told. It presented a view of American character and temperament not usual in French fiction; and irreproachable in its moral tone, has become a sort of classic for American schools and colleges. ‘La Famille Cardinal’ (The Cardinal Family) and ‘Crichette’ are studies in fiction of aspects of Parisian life. ‘Notes and Souvenirs’ embody observations during the Prussian invasion of 1871. They are interesting, as giving faithful pictures of the temper of the people during those days. Among his short stories, ‘Un Mariage d'Amour’ (A Marriage for Love) is one of the best. The complete dramatic works of Halévy and Meilhac appeared in eight volumes (1900–02). Consult d'Alméras, H., ‘Avant la Gloire; leurs débuts’ (Paris 1903); and Matthews, ‘French Dramatists of the Nineteenth Century’ (3d ed., New York 1901).

HALF BLOOD, in law, the relationship of persons born of the same father but not of the same mother, which is called a consanguinean relation; or of those born of the same mother but not of the same father, which is termed uterine. In the succession to real or landed property a kinsman of the half blood inherits next after a kinsman of the whole blood in the same degree, and after the issue of such kinsman when the common ancestor is a male, but next after the common ancestor when such ancestor is a female. So that brothers consanguinean inherit next after the sisters of the whole blood and their issue; and brothers uterine inherit next after the mother.

HALF-BREEDS, (1) the children of parents of different races; a term usually confined to whites and American Indians. The rise of independent half-breed tribes is “the first step toward the evolution of a distinct race.” (2) A term derisively applied to certain Republicans of New York who in 1881 supported the administration of President Garfield in opposing the party candidate for the governorship of the State.

HALF-CASTE, a person born of a European father and a Hindu or Mohammedan mother, or more rarely of a Hindu or Mohammedan father and a European mother; an East Indian.

HALF-CROWN, a British silver coin of the value of two shillings and sixpence (60 cents).

HALF-DOLLAR, a silver coin of the United States of the value of 50 cents. Authorized in April 1792, its coinage at a weight of 208 grains was begun in 1794; its issue was suspended from 1798 to 1800 inclusive and in 1816. In 1853 its weight was reduced to 192 grains. The half-dollar is legal tender to the amount of $10.

HALF-EAGLE, a gold coin of the United States of the value of $5, so called from the national emblematic bird which figures upon the reverse. Authorized in 1792 the coinage was begun in July 1795.

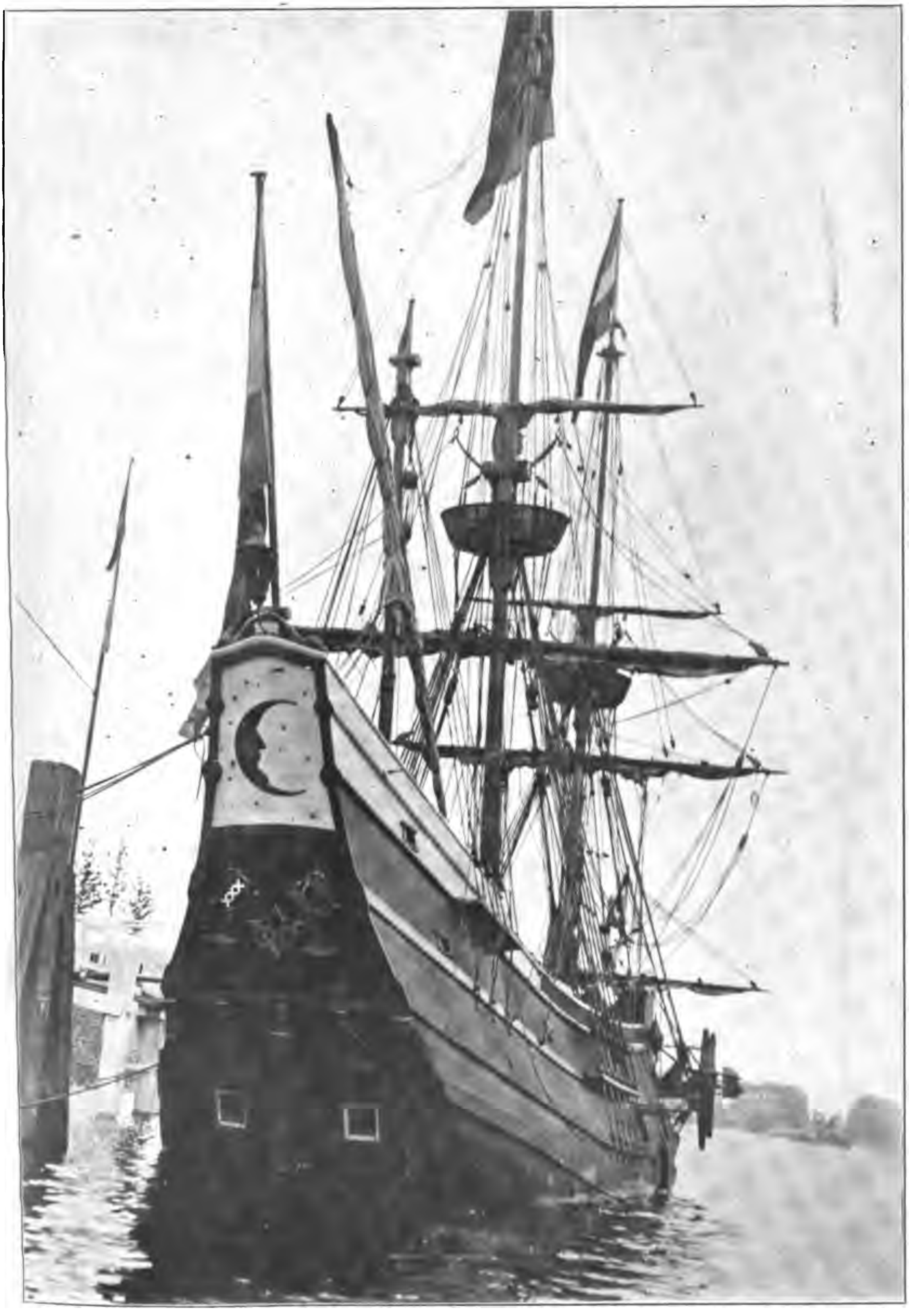
HALF-KING, the name given by the English to a Seneca Indian, chieftain of an Ohio tribe, who accompanied Washington during his expeditions in 1753–54, and was present at the defeat of the French at Great Meadows.

HALF MOON, the name of the vessel commissioned by the Dutch East India Company in 1609, and commanded by Henry Hudson for a voyage of exploration in search of a Northwest Passage. In this ship he entered New York Bay and explored the river which bears his name.

HALF-TONES. See PHOTO-ENGRAVING.

HALF-WAY COVENANT, a concession in church requirements made by the New England Synod convened at Northampton in 1657, whereby persons who had been baptized in their infancy, who assented to the doctrines of faith, entered into covenant with the Church, and led decent and respectable lives, were admitted to the privileges and prerogatives of church-membership with the exception of the Lord's Supper, although they might give no evidence of conversion and had neither the ability nor the willingness to make profession of religious experience. This “half-way covenant,” as it came to be called, aroused bitter controversy which did not die out until the 19th century; among its most strenuous opponents were Jonathan Edwards and his followers. The contention is baseless that it entailed certain civil privileges in relation to the State franchise, its chief aim being to admit children to baptism and to transmit to them the same degree of church membership as their parents enjoyed. Consult Walker, ‘Creeds and Platforms of Congregationalism’ (1893).

HALIBURTON, hăl'ĭ-bėr-tŏn, **Thomas Chandler,** Canadian historian and humorist: b Windsor, Nova Scotia, December 1796; d. Isleworth, near London, 27 Aug. 1865. He practised law in Halifax, was raised to the bench in 1829, and in 1841 became judge of the Supreme Court of Nova Scotia, but resigned in 1856 and went to live in England. His first work was a ‘Historical and Statistical Account



MODEL OF THE "HALFMOON"

The Vessel in which Henry Hudson Sailed up the River which Bears His Name

of Nova Scotia› (1829). In 1835 he contributed a series of letters to a Halifax newspaper under the pseudonym of «Sam Slick,» clock-peddler. These were published with considerable alterations and additions in a collected form in 1837 under the title of ‹The Clockmaker, or Sayings and Doings of Samuel Slick of Slickville,› and their humor, genial satire and sparkling aphorisms won them immediate popularity. A second series followed in 1838, and a third in 1840. In ‹The Attaché, or Sam Slick in England,› his hero is represented as attaché of the American embassy at the court of Saint James, and again appears in ‹Sam Slick's Traits of American Humor› (1852). Haliburton, as the creator of «Sam Slick,» may claim to be the founder of the school of American humor, and he was the first to use the American dialect as the medium of literature. In 1859 Haliburton was elected member of Parliament for Launceston.

HALIBUT, the largest of the flat fishes (*Hippoglossus hippoglossus*), and one of the most important and highly prized food-fishes. It occurs in all northern waters, south to France, New York and San Francisco. It reaches a weight of 400 pounds — one is recorded as taken on the coast of Sweden reaching 720 pounds — and is characterized by having the eyes on the right side, the ventral fins and mouth symmetrical and the lateral line arched in front. It is dark brown on the right side and white on the left or lower side. It was formerly very abundant along the whole eastern coast of the United States, at times proving a nuisance from its numbers to the cod-fishers. It has gradually become scarcer, and at the same time the appreciation of it as a food-fish has increased, so that the halibut fishers have gone farther and farther for it until now a good proportion of the catch comes from the waters around Iceland. The value of the catch in New England in 1916 was $103,754; and for Canada $468,493. On the Pacific Coast — where three varieties are found — the halibut industry ranks next in importance to the salmon, and the catch brought into American ports was valued (1916) at $2,050,709. A second species, the Greenland halibut (*Reinhardtius hippoglosoides*), occurs in the Arctic Atlantic, but is not very common. It is yellowish brown and has a straight lateral line. In the trade this is not distinguished from the common species. Halibut are taken with hook and line (or trawls) using fresh fish (herring, etc.) for bait.

HALICARNASSUS, Greek city of Caria, Asia Minor, on the north shore of the Ceramic Gulf. Originally settled by a colony from Trœzen, it was one of the cities of the Dorian Hexapolis. However, the Ionians soon gained the upper hand in the population, and the city was forced to withdraw from its early allegiance. The citadel of Halicarnassus was at Salmacis, a Carian city, not far distant. Passing under Persian rule, it participated in the naval attacks of Xerxes. Later, it succeeded in freeing itself from the Persians; became a member of the Athenian League for a while; was reconquered by Persia and became a free city and capital of Caria in the 4th century. Here was erected the tomb of Mausolus, about 325 B.C., which was unearthed and revealed many interesting relics. (See Mausoleum). Salmacis did not yield to Alexander the Great, although he succeeded in demolishing the town proper. Halicarnassus is known also as the birthplace of the Greek historians Herodotus and Dionysius. In the 15th century it was fortified by the Knights of Saint John, who named it Petronion, whence was derived its present name Budrun. Interesting ruins of the old city have been uncovered.

HALICZ, häl'itch, a town in Galicia, Austria, on the right bank of the Dniester, 70 miles by rail southeast of Lemberg; population, over 5,000. During the European War Halicz was the scene of much severe fighting on account of its strategic importance as the key to Lemberg. The Russians seized it in August 1914; on 1 March 1915 the Austrians were defeated here in a pitched battle, but succeeded in recapturing the town on 28 June 1915, during the great Austro-German offensive. A Russian attack failed in 1916, but on 1 July 1917 General Brussilov opened a great offensive in Galicia — Russia's last effort in the war — and regained possession of Halicz on 10 July. Meanwhile wholesale demoralization spread among the Russian troops; those ordered to attack assembled instead in meetings to discuss whether or not they should obey orders. On 22 July the army was retreating to the East and Halicz, so long struggled for, was given up again. See War, European.

HALIFAX, Charles Montague, 1st Earl of, English politician: b. Horton, Northamptonshire, 16 April 1661; d. 19 May 1715. He first attracted notice by his verses on the death of Charles II; and in 1687, in conjunction with Matthew Prior, wrote ‹The Town and Country Mouse,› a parody on Dryden's ‹Hind and Panther.› He was a member of the Convention Parliament of 1689 and supported the claim of William III to the crown. He became a lord of the treasury in March 1692; in 1694 was made Chancellor of the Exchequer; in 1695 carried out the much needed recoinage, appointing Newton warden of the mint; and in 1696 he devised the system of exchequer bills. His administration was distinguished by the adoption of the funding system, and by the establishment of the Bank of England. In 1700 he was raised to the peerage, under the title of Baron Halifax. In the reign of Anne he remained out of office, but he actively exerted himself to promote the union with Scotland, and the Hanoverian succession. He was First Lord of the Treasury on the accession of George I, who created him an earl, and bestowed on him the Order of the Garter. The ‹Life and Miscellaneous Works of Lord Halifax› were published in 1715, and his poems were included in the edition of ‹English Poets› by Dr. Johnson.

HALIFAX, Canada, capital of the province of Nova Scotia and county-seat of Halifax County, a city and port of entry beautifully situated on Halifax Harbor on the Atlantic seaboard in lat. 44° 39′ N. and long. 63° 37′ W.

Topography.—The harbor, originally known as Chebucto, «chief of havens,» is one of the finest in the world. It is 16 miles long from north to south, with an average width of a mile; has an average tide of four to six feet; is ice-free; and is practically all deep water.

It terminates in Bedford Basin, a beautiful sheet of water four miles wide, affording 10 square miles of safe anchorage. The North West Arm, a narrow, deep harbor three miles long and from one-quarter to one-half mile wide, with wooded banks, on the west of the city, is a charming bay, much utilized for pleasure purposes; on its banks are many villa residences of the wealthier Haligonians. The harbor can be entered day or night at any season of the year by vessels of any size. The distance from Halifax to Fastnet Rock (Ireland) is 2,162 miles, or 600 miles less than from New York, and the transatlantic passage is accordingly one day shorter from Halifax than from New York.

Railways, Shipping, etc.— Halifax is the ocean terminus of the Canadian government railways, and through it of the Canadian Pacific, the Canadian Northern and the National Transcontinental railways. Branch lines of these roads radiate to various parts of the province. Halifax was the home of Samuel Cunard, the founder of the Cunard Line, and the early packets of that line made Halifax a port of call; now steamship lines run to Prince Edward Island, Quebec, Newfoundland, Saint Pierre, Boston, New York, Mexico, Bermuda and the West Indies, and various ports in Great Britain and the Continent. When the Saint Lawrence freezes, Halifax, as the chief winter port of Canada, is the natural terminus of the mail and fast passenger Atlantic liners. Halifax is also the nearest North American port to most of the South American countries and to South Africa. It is also an important cable centre. In 1914 the shipping tonnage entering the port was 3,901,094. A United States consul-general is resident in Halifax. Under construction in 1916 by the Canadian government are comprehensive national ocean terminals to cost $35,000,000, occupying one and one-half miles waterfront, covering 200 acres of land and 60 acres of water, providing 27 standard steamship berths. They will comprise when completed a bulkhead landing quay 2,006 feet long and five concrete piers, faced with granite, 1,250 feet long and 320 to 360 feet wide, with a minimum depth at low water of 45 feet. There will be also two grain elevators and a union passenger depot. All railway lines converge at these terminals, affording transportation facilities not surpassed at any port. These terminals are within 20 minutes steaming of the open Atlantic Ocean. These terminals are in addition to the present government terminals further up the harbor, giving berthing accommodation for 10 Atlantic liners; the newest of these is of concrete and cost $1,250,000. Halifax is the chief fortress and naval station in Canada. The harbor and approaches are protected by many modern forts and batteries. On account of its fortifications it has been called the «Cronstadt of America,» and by Kipling «The Warden of the Honor of the North.» The naval dockyard covers 14 acres with a water frontage of 2,700 feet. Halifax has also a graving dock 600 feet long, 102 feet wide, with 30 feet of water on the sill; and in connection therewith a steel ship repairing plant. There is also a marine railway and a grain elevator. On account of its proximity to the coal mines of Pictou and Cape Breton it is a favorite bunkering port.

Municipal Conditions, etc.— In its earlier days Halifax was mainly a military and naval entrepot, but has become more and more a commercial city. It has always been a prominent banking centre, and is the home of two of the largest chartered banks of the Dominion, the Bank of Nova Scotia and the Royal Bank of Canada; it is the wealthiest per capita city of Canada. Dartmouth, on the opposite shore of the harbor, practically a suburb of Halifax, has a population of 6,000. The city is built on the western side of the harbor for about five and one-half miles, and is on a hill which is crowned by an elaborate but antiquated citadel. The streets are regularly laid out, are paved and electric-lighted and have electric tramways. The older public buildings and the commercial portion of the city are built chiefly of freestone, and the houses of wood. The most notable structures include Government House, the official residence of the lieutenant-governor, the Province Building, the seat of the legislature, Saint Paul's Church, the oldest Protestant church edifice in British North America, Dalhousie University buildings, the Anglican and Roman Catholic cathedrals, the Technical College, city hall, court house, post office, customs house, admiralty house, Wellington barracks, armories, many banks, several hospitals and other charitable institutions. The beautiful Public Gardens, covering 17 acres, and the natural park at Point Pleasant are especially noteworthy. Halifax has a moderate, equable climate with an average summer temperature of 66°. It is the residence of the Roman Catholic archbishop of Halifax, and the Church of England bishop of Nova Scotia. It is noted for its educational and philanthropic institutions, chief among which are the non-sectarian Dalhousie University (q.v.) with faculties of arts and sciences, law, medicine and dentistry and a department of pharmacy; the Pine Hill Presbyterian Theological College; the Roman Catholic Saint Mary's College, doing preparatory and elementary college work; the Nova Scotia Technical College, supported by the provincial government, giving the final two years of engineering courses (the first two years' work being given in Dalhousie and other colleges), and being the centre of the government trade, mining and technological classes and night schools of great value and high excellence; the Royal Naval College of the Dominion for the training of midshipmen and seamen for the Canadian navy; Halifax Ladies' College (preparatory) and Conservatory of Music, the latter in affiliation with Dalhousie University; two convent schools and several high schools; the Victoria School of Art and Design; and a free public library. The School for the Deaf and the School for the Blind are noted for the excellence of their methods, and are the only ones in eastern Canada and have pupils from all over the Dominion and Newfoundland. The Victoria General Hospital and the Nova Scotia Hospital for the Insane are supported by the provincial government and have training schools for nurses.

Commerce.— The chief occupations of the inhabitants are commerce, manufacturing and in the businesses associated with the fisheries, transportation and shipping. The city has considerable West Indian trade, exporting lumber, fish, flour and other agricultural products, and

HALIFAX, N. S.

1 City of Halifax from the Citadel

2 North West Arm

importing sugar, rum, molasses, fruits and other sub-tropical products; much of the commerce of the province is carried on through Halifax. The principal manufactures are wooden cars and car and other iron and brass castings, machinery, boilers, agricultural implements, skates, nuts and bolts, nails, paints, gunpowder, cordage, leather, boots and shoes, clothing, soap, cotton and woolen goods, woodwork and woodenware, tar and products, fertilizers, chocolates, spices, biscuits, aërated waters. There are two large sugar refineries, a molasses refinery and several distilleries and breweries, also several large fish-curing and packing and cold-storage establishments, sending their products to the United States, the West Indies, South America and the Mediterranean. In 1915 its manufactures, including fish and fish products, were valued at $20,730,000; exports, $32,175,231; imports, $10,712,585; customs receipts, $2,488,106; bank clearings, $104,414,589.

History and Government.— In 1749 the British government sent out an expedition under the Hon. Edward Cornwallis to settle upon the strategic position now called Halifax, so named by Cornwallis in honor of Lord Halifax, president of the Commissioners of Trade and Plantations. The following year it was made the capital of Nova Scotia, then including New Brunswick and Prince Edward Island, in place of Annapolis Royal; in 1817 it was declared a free port; in 1842 it was incorporated as a city. It is governed by a mayor, elected annually, and four controllers and a council of 12 members holding office for two years. The city and county send two members to the Dominion House of Commons and five to the provincial legislature. A fine tower erected in 1912 on the shores of the North West Arm commemorates the fact that Nova Scotia had the first representative government of any portion of the empire, this privilege being granted in 1758. On 6 Dec. 1917 as the result of an explosion and conflagration, caused by the collision of two ships, one carrying a cargo of war munitions, the north end of the city and Dartmouth on the east side of the harbor were devastated. From the North Street Railway station as far north as Africville to Bedford Basin, an area of about two and one-half square miles was totally destroyed by the explosion and fires which followed. A blizzard the next day impeded the work of salvage; 1,158 dead bodies were recovered from the ruins, of which 854 were identified and 304 unidentified; 4,000 persons were seriously injured; 20,000 were rendered homeless; while the total property loss was estimated at $50,000,000. The damage to government, military, naval, provincial, civic, industrial, institutional and church property was half of the amount. The Dominion government made an appropriation of $1,000,000 for immediate relief; a relief fund of $25,000,000 was raised for necessary work; and clearing and reconstruction operations were at once instituted.

A. Stanley Mackenzie,
President of Dalhousie University.

HALIFAX COMMISSION, the designation for the commission of representatives of Great Britain and the United States which met at Halifax, Nova Scotia, in 1877, to determine the amount of compensation to be paid by the United States for the privileges which under the provisions of the fisheries treaty of 1871 between the two countries had allowed the fishermen of the United States to take fish along the shores of Canada and Newfoundland. The great value of the British fishing waters was admitted and the sum of $5,500,000 was awarded Great Britain. The 10-year treaty which went into operation in 1873 was terminated by the United States government in 1885, and an attempt to renew it by the Chamberlain-Bayard Treaty in 1888 was frustrated by the rejection of the United States Senate. A modus vivendi, however, was arranged for, which the Dominion Parliament enacted as a law in 1890.

HALIFAX PLATFORM, the program enunciated in 1907 by Mr. R. L. (now Sir Robert) Borden as leader of the Liberal-Conservative opposition in Canada. It declared for provincial autonomy, civil service and Senate reform, the enforcement of purity in election contests, the placing of government railways under an independent commission, the creation of a public utilities commission, moderate protection and preferential trade within the empire.

HALITE, the mineralogical name for native common salt, rock salt or sodium chloride, NaCl. Halite crystallizes in the isometric system, usually in cubes. It has a hardness of 2.5, and a specific gravity of 2.135 when pure, though it often occurs mixed with calcium sulphate and with the chlorides of calcium and magnesium, the specific gravity being modified accordingly. Halite is usually colorless or white, though it is sometimes colored by impurities. Its refractive index for yellow sodium light is 1.5442, and transparent crystals of it are used somewhat in the manufacture of prisms and lenses, since the mineral is far more transparent than glass to the infra-red rays of the spectrum. Tyndall made extensive use of it in this way, for example, in his researches on radiant heat. Consult his 'Contributions to Molecular Physics in the Domain of Radiant Heat.' See Salt; Sodium.

HALL, Alexander Wilford, American editor and author: b. Bath, N. Y., 18 Aug. 1819; d. 1902. He became known as an evangelist especially through attacks on Universalist doctrine and the theory of evolution presented by Darwin, Huxley and Haeckel. In 1881 he established *The Microcosm,* and in 1893 became president of the Society for Philosophical Research. In 1891 he was elected Fellow of the Philosophical Society of Great Britain. His works include 'Universalism Against Itself'; 'The Problem of Human Life'; 'The Immortality of the Soul'; and 'The Hygienic Secret of Health.'

HALL, Anna Maria Fielding, British novelist: b. Dublin, Ireland, 6 Jan. 1800; d. East Moulsey, Surrey, England, 30 Jan. 1881. In her 15th year she went to London, where she was married to the well-known writer, S. C. Hall (q.v.). She published 'Sketches of Irish Character' (1829); 'The Buccaneer' (1832); 'Tales of a Woman's Trials' (1835); 'Saint Pierre, the Refugee,' a burletta; 'Uncle Horace' (1837); 'Lights and Shadows of Irish Life' (1838); 'Marian' (1839); 'Midsummer Eve' (1843); 'The Whiteboy' (1845), etc. Besides assisting her husband in writing 'Ireland: its Scenery, etc.' (1841–43) and other works, she assisted in the establishment of a hospital for consumptives and the Nightingale Fund, which resulted in the endowment of a training-school for nurses.

HALL, Arthur Crawshay Alliston, American Protestant Episcopal bishop; b. Binfield, Berkshire, England, 12 April 1847. He was graduated from Christ Church, Oxford, in 1869, took orders, entered the Society of Saint John the Evangelist (Cowley Fathers), in 1874 became assistant minister of the church of the Advent, Boston, and from 1882 to 1891 was there minister of the mission church of Saint John the Evangelist. In 1894 he was consecrated bishop of Vermont, after release from the Cowley order. His publications include 'Confession and the Lambeth Conference' (1879); 'Meditations on the Creed' (1880); 'Meditations on the Collects' (1887); 'Preaching a Pastoral Care'; 'Christian Unity'; 'The Doctrine of the Church' and other doctrinal and devotional works.

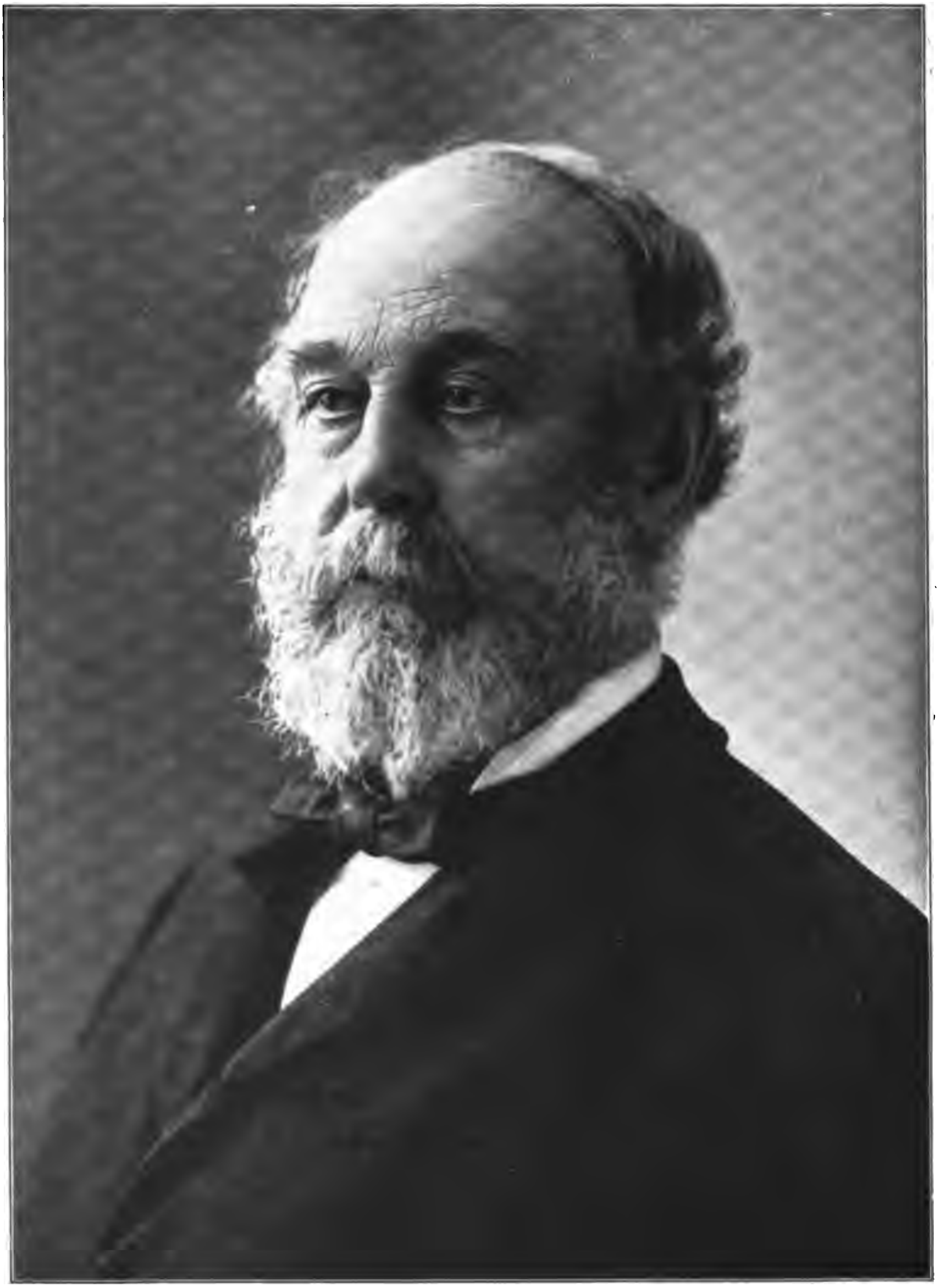
HALL, Asaph, American astronomer: b. Goshen, Litchfield County, Conn., 15 Oct. 1829; d. Annapolis, Md., 22 Nov. 1907. After private study he attended Central College, McGrawville, N. Y., in 1854–55 was for a term a pupil of Francis Brunnow at the University of Michigan, taught at Shalersville, Ohio, and later was appointed assistant to Bond in the Harvard Observatory. He became assistant in the Naval Observatory at Washington in 1862, and in 1863 professor of mathematics in the navy, with relative rank of captain. He continued in the government service until 1891, when he was retired on account of age, with relative rank of captain. While at the Naval Observatory, he was dispatched on several expeditions, including those for observation of solar eclipses to Bering Strait in 1869, to Sicily in 1870 and to Colorado in 1878. He was also in charge of the American party sent to observe the transit of Venus at Vladivostock, Siberia, in 1874, and chief astronomer of the expedition to San Antonio, Tex., for the transit of 1882. Among his many discoveries the most important is that of the moons of Mars (August 1877), which he named Deimos and Phobos, and whose orbits he calculated. Among his later work is a valuable study of double stars. In 1895–1901 he was professor of astronomy at Harvard. He received the Lalande prize of the French Academy of Sciences in 1878, its Arago medal in 1895, and the gold medal of the Royal Astronomical Society in 1879. In 1902 he was president of the American Association for the Advancement of Science.

HALL, Basil, British naval officer and writer: b. Edinburgh, 31 Dec. 1788; d. Portsmouth, England, 11 Sept. 1844. He entered the navy in 1802, and accompanied Lord Amherst's expedition to China in 1815, a trip which supplied him with the materials of his first work, 'A Voyage of Discovery to the West Coast of Corea, and the great Loo Choo Island in the Japan Sea.' This work, first published in 1818, had a very extensive circulation. In 1827 he made a tour in Canada and the United States, and published his 'Travels in North America' (1829), a work which excited much adverse criticism in the United States by reason of its outspoken and somewhat supercilious comments and observations. 'Fragments of Voyages and Travels' appeared in 1831–33, and was followed by 'Schloss Hainfield, or a Winter in Styria' and 'Patchwork' (1841).

HALL, Bolton, American lawyer and lecturer: b. Ireland 1854. A son of Rev. Dr. John Hall (q.v.), he was graduated from Princeton in 1875, and from Columbia Law School in 1888, became known as a writer and lecturer in connection with various reforms, and has been identified with the University extension movement. Among the causes advocated by him are the cultivation of vacant lots by the unemployed, and the restoration of the land to the people. In 1916 he established the Free Acres Association, a settlement organized to demonstrate the practicability of the Single Tax. His publications include 'Things as They Are' (1899); 'Free America' (1903); 'Monkey Shines' (1904); 'Three Acres and Liberty' (1907); 'The Garden Yard' (1909); 'What Tolstoi Taught' (1911); 'The Gift of Sleep' (1911); 'The Mastery of Grief' (1912); 'Thrift' (1916).

HALL, Charles Cuthbert, American Presbyterian clergyman: b. New York, 3 Sept. 1852; d. New York, 25 March 1908. He was graduated from Williams College in 1872, studied theology at the Union Theological Seminary 1872–73, and at the Presbyterian College in London and the Free Church College, Edinburgh. He was pastor of the Presbyterian Church, Newburg, N. Y., 1875–77, and of the First Presbyterian Church, Brooklyn, N. Y., 1877–97. In 1897 he was elected president of Union Theological Seminary. He published 'Into His Marvellous Light' (1891); 'Does God Send Trouble?' (1894); 'The Children, the Church and the Communion' (1895); 'The Gospel of the Divine Sacrifice' (1896); 'Christ and the Human Race' (1906); 'Christ and the Soul' (1909).

HALL, Charles Francis, American Arctic explorer: b. Rochester, N. H., in 1821; d. Thank God Harbor, Greenland, 8 Nov. 1871. Becoming interested in the fate of the Franklin expedition, he devoted his leisure to gathering information about Arctic America, and made two search expeditions, in 1860–62 and 1864–69, living alone among the Eskimo, and bringing back relics of the Franklin expedition and the supposed bones of one of Franklin's company. Natives whom he encountered in 1869 near the southern shore of King William Land gave him a report of the fate of 79 of the 105 who perished by starvation in that region. He thus contributed much to the details of the expedition's final history. In 1871 he sailed in command of the government ship *Polaris,* on an expedition to the North Pole. On 29 August he reached 82° 11′ N., at that date the highest north latitude ever reached. Then turning south he went into winter quarters at Thank God Harbor, Greenland (81° 38′ N.). Here he was taken suddenly ill and died. Over his grave a grateful epitaph was placed by the British polar expedition in 1876. His companions left Thank God Harbor in August, 1872, but in October, through the ice-anchor slipping, 19 men were left with stores on a floe, and only after five months of severe suffering were they rescued by a sealer off the Labrador coast in the following April. The *Polaris* drifted to the coast of Greenland, at a point not far south of



ASAPH HALL

Late Professor of Astronomy, Harvard University

Smith Sound, and thence in the spring the party set out in boats and was rescued by the Scotch whaler *Ravenscraig*, off Cape York. Among the valuable results of Hall's work were the exploration of Kennedy Channel, the discovery of Robeson Channel and Hall Basin, and the extension of Greenland and Grinnell Land 1½° N. Hall was less a scientist than a fearless and resourceful explorer. He published 'Arctic Researches, and Life among the Esquimaux' (1864); and mainly from his papers was compiled the 'Narrative of the Second Arctic Expedition' (1879). Consult Davis, 'Polaris North Pole Expedition' (1876).

HALL, Chester Moor, English inventor: b. Leigh, Essex, England, 9 Dec. 1703; d. Sutton, Essex, 17 March 1771. He was a large landowner in Essex, and convinced from study of the human eye that achromatic lenses were possible, he discovered two varieties of suitable glass in 1729, and in 1733 made several telescopes later declared by experts to be achromatic. Indifferent to his claims of priority, he did not appear at the trial of Dollond *v.* Champness. Later his invention of the achromatic telescope in the year 1733 was adjudged by Lord Mansfield conclusively proved.

HALL, Christopher Newman, English Congregationalist clergyman: b. Maidstone, England, 22 May 1816; d. London, 18 Feb. 1902. He was educated at Highbury College and ordained in 1842, his first charge being at Hull. In 1854 he was made pastor of Surrey Chapel, Blackfriars road, London, from which place he moved with his congregation into Christ Church, Westminster Bridge road, erected mainly through his exertions, and of which he became pastor emeritus in 1892. During the Civil War he did much by tongue and pen to give his countrymen correct ideas of the nature of the struggle in the United States. In 1865 he visited this country and again in 1873 when he delivered lectures in the principal cities. He was the author of 'Plain Truths Plainly Put' (1861); 'From Liverpool to Saint Louis' (1870); 'Prayer; Its Reasonableness and Efficacy' (1883); 'Gethsemane; or Leaves of Healing from the Garden of Grief' (1891); 'Newman Hall, an Autobiography' (1898); and of a famous tract 'Come to Jesus' (1840), of which millions of copies have been issued, etc.

HALL Fitzedward, American philologist: b. Troy, N. Y., 21 March 1825; d. Marlesford, England, 1 Feb. 1901. He was obliged to leave Harvard in 1846, just before he would have graduated, and went to India, where he spent many years, made a thorough study of its tongues and contributed to its local journals original translations and original articles. In 1850 he became tutor, in 1853 professor, in the government college at Benares; in 1855 was transferred to Ajmere as inspector of schools for Ajmere and Maiwara; and in 1856 to a like post in the Central Provinces. In 1860 he was granted a degree of D.C.L. by Oxford. In 1862–79 he was professor of Sanskrit, Hindustani and Indian jurisprudence in King's College, London; in 1864 became examiner in Hindustani and Hindu to the Civil Service Commission; in 1880 examiner in Sanskrit to succeed Max Müller; and in 1887 also examiner in English. He was the first American to edit a Sanskrit text — 'The Atmabodha, with its Commentary, and the Tattvabodha' (1852). He prepared also an edition of the 'Vishnupurâna,' containing numerous quotations from manuscripts owned by him; and editions of many other Sanskrit books. His collection of 1,000 Oriental manuscripts and 1,000 works on special subjects he gave to Harvard. He wrote 'Modern English' (1873), 'Doctor Indoctus' (1880), and other works on English philology, and contributed to the 'New Oxford Dictionary.'

HALL, Florence Marion Howe, American author and lecturer: b. Boston, 25 Aug. 1845. She is a daughter of Julia Ward Howe (q.v.). Prominent in the women's club movement, she became vice-president of the General Federation of Women's Clubs, and chairman of the educational department of the New Jersey State Federation of Women's Clubs. In 1893–1900 she was president of the New Jersey Women's Suffrage Association. Her writings include 'Social Customs' (1887); 'The Correct Thing' (1888); 'Handbook of Hospitality' (1910); 'The A. B. C. of Correct Speech' (1916). She was an honorary vice-regent of the D. A. R. in 1914. She has delivered many lectures for the Woman Suffrage party.

HALL, Francis Joseph, American Episcopal theologian: b. Ashtabula, Ohio, 24 Dec. 1857. He was graduated from Racine College, Wisconsin, and the Western Theological Seminary, Chicago, and was instructor and professor of dogmatic theology in the Western Theological Seminary from 1886 to 1913, becoming professor of dogmatic theology in the General Theological Seminary, New York, that year. He has published three volumes of 'Theological Outlines' (1892–95; 2d ed. in 1905 and 1915); 'Historical Position of the Episcopal Church' (1896); 'The Kenotic Theory' (1898); 'Introduction to Dogmatic Theology' (1907); 'Authority Ecclesiastical and Biblical' (1908); 'The Being and Attributes of God' (1909); 'Evolution and the Fall' (1910); 'The Trinity' (1910); 'Creation and Man' (1912); 'The Incarnation' (1915); 'The Passion and Exaltation of Christ' (1918).

HALL, Gertrude, American writer: b. Boston, 8 Sept. 1863. She was educated in Florence. She has written 'Far from To-Day,' a collection of short stories; 'Allegretto,' a book of verse; 'Foam on the Sea, and Other Tales'; 'The Hundred and Other Stories' (1898); 'The Age of Fairy Gold,' verse (1899); 'April's Sowing' (1900); 'The Wagnerian Romances' (1910); 'The Unknown Quantity' (1910); 'The Truth about Camilla' (1913); and translations of Rostand's 'Cyrano de Bergerac' and 'Chantecler'; and 'Poems' of Paul Verlaine. Her work, both in verse and prose, is distinctively original.

HALL, Gordon, American missionary at Bombay: b. Tolland, Mass., 8 April 1784; d. Bombay, 20 March 1826. He was graduated at Williams College in 1808 and having studied theology, offered himself as a missionary to the American Board of Commissioners for Foreign Missions. Ordained at Salem in February 1812, he sailed the same month for Calcutta and arriving at Bombay in 1813, spent 13 years in missionary labors. No missionary in western India has been more respected among the Brahmins and higher classes than he. Beside publishing several missionary tracts he revised the Mahratta New Testament.

HALL, Granville Stanley, American psychologist and college president: b. Ashfield, Mass., 6 May 1845. He was graduated from Williams College in 1867, studied also at Berlin, Bonn, Heidelberg and Leipzig, was professor of psychology in Antioch College (Ohio) in 1872–76, and lecturer on psychology at Harvard and Williams in 1880–81. From 1881 to 1888 he was professor of psychology in the Johns Hopkins University; and in 1888 became president of Clark University, then newly founded at Worcester, Mass., and professor of psychology in the institution. He soon became known as an authority on education and a leader in the “new psychology.” In 1892 he was president of the American Psychological Association. He founded and edited the *Pædagogical Seminary,* the *American Journal of Psychology* and the *Journal of Race Development* (after 1910). He published ‘Aspects of German Culture’ (1881); ‘Hints Toward a Select and Descriptive Bibliography of Education’ with Mansfield (1886); ‘Methods of Teaching History’; ‘How to Teach Reading’; ‘The Contents of Children's Minds on Entering School’ (1894); ‘Adolescence’ (2 vols., 1904); ‘Youth: Its Education and Regimen’ (1906); ‘Educational Problems’ (2 vols., 1911); ‘Jesus, the Christ, in the Light of Psychology’ (1917). Consult Partridge, G. E., ‘Genetic Philosophy of Education: An Epitome of the Published Writings of G. Stanley Hall’ (New York 1912).

HALL, Isaac Hollister, American Oriental scholar: b. Norwalk, Conn., 12 Dec. 1837; d. Mount Vernon, N. Y., 2 July 1896. Graduated from Hamilton College in 1859, he was there tutor until 1863; in 1865 was graduated from the Columbia Law School and until 1875 was a practitioner in New York. In 1875–77 he was professor in the Syrian Protestant College at Beirut, and later at Cyprus aided General di Cesnola, then United States consul, in the arrangement of the Cypriote collection now in the Metropolitan Museum of New York. (Consult *Scribner's Magazine,* June 1880). From 1884 until his death he was curator of sculpture and archæology in the Metropolitan Museum. He also lectured on New Testament Greek at the Johns Hopkins University; published (1884) an account, with facsimile pages, of the Syrian manuscripts of the Gospels, Acts and the larger part of the Epistles, discovered by him (1876) at Beirut; and compiled a ‘Critical Bibliography of the Greek New Testament’ (1884).

HALL, Sir James, English geologist and chemist: b. 1761; d. Edinburgh, 23 June 1832. Early interested in geological questions, he made the acquaintance of James Hutton (q.v.) and Playfair, and himself states that he came to adopt Hutton's system after three years of almost daily discussion with its founder. In the examination of this system, whose leading principle explains the conformation of the earth's crust by the action of constant natural changes, he traveled in Scotland, the Alps, Italy and Sicily. Hall was the first geologist directly to apply chemical laboratory tests to the hypotheses of geology, but published no results of his work in this field until after the death (1797) of Hutton, who objected to Hall's judgment of the vast operations of nature through “having kindled a fire and looked into the bottom of a little crucible.” He invented a machine for the regulation of high temperatures, and in 1807–12 represented the borough of Michael (or Mitchell), Cornwall, in Parliament.

HALL, James, American lawyer and author: b. Philadelphia, 19 Aug. 1793; d. near Cincinnati, Ohio, 5 July 1868. He served in the army 1812–18, and subsequently studying law became judge of the Circuit Court of Illinois, and also State treasurer. In 1833 he took up his residence in Cincinnati, and devoted himself to banking and literature. His chief works are ‘Legends of the West’; ‘Harpe's Head, a Legend of Kentucky’ (1833); ‘Sketches of the West’ (1835); ‘Tales of the Border’ (1835); ‘Notes on the Western States’ (1838); ‘History of the Indian Tribes’ (1838–44) with McKenney; ‘The Wilderness and the Warpath’ (1845); ‘Romance of Western History’ (1859).

HALL, James, American geologist and palæontologist: b. Hingham, Mass., 12 Sept. 1811; d. near Bethlehem, N. H., 7 Aug. 1898. He studied at the Rensselaer Polytechnic School for six years, and was subsequently professor of geology there, and in 1837 was appointed to a position on the New York Geological Survey. In 1855 he was appointed State geologist of Iowa. In 1850 he was elected by the Royal Geographical Society of London one of its 50 foreign members, and in 1858 received the Wollaston Medal from that scientific body. In 1856 he was president of the American Association for the Advancement of Science, and in 1889 was president of the Geological Society of America. He was a distinguished member of many scientific societies at home and abroad and was held in the highest esteem for his attainments in geology and palæontology. Among his publications may be named ‘Geology of New York’ (1843); ‘Palæontology of New York’ (1847 *et seq.*); ‘Graptolites of the Quebec Group’ (1865); as well as parts of the Geological Reports of Iowa (1858–59); and also of Wisconsin (1862).

HALL, John, American Presbyterian clergyman: b. near Armagh, Ireland, 31 July 1829; d. Bangor, County Down, Ireland, 17 Sept. 1898. He was educated at Belfast College and after holding several pastorates in Ireland, in 1867 became pastor of the Fifth Avenue Presbyterian Church, New York. He was chancellor of the University of the City of New York 1882–90, and was also trustee of Princeton University, Union Theological Seminary and of Wellesley College. He was noted for his simple eloquence and impressive sincerity and was one of the most prominent clergymen in his denomination. He wrote ‘Family Prayers for Four Weeks’ (1868); ‘Papers for Home Reading’ (1871); ‘Questions of the Day’ (1873); ‘God's Word through Preaching’ (1875); ‘Foundation-Stones for Young Builders’ (1879); ‘A Christian Home: how to Make and how to Maintain It’ (1883); ‘Light Unto My Path’ (1895).

HALL, John M., American railroad president: b. Willimantic, Conn., 16 Oct. 1841; d. New Haven, Conn., 27 Jan. 1905. He was graduated from Yale in 1866 and from the Columbia Law School in 1868. He took up the practice of law in his native town and became a judge of the Superior Court in 1889, resigning in 1893 to become vice-president of the New York, New Haven and Hartford Railroad Company. On the death of President Clark in 1899, Judge Hall succeeded him as president.

HALL, Joseph, English prelate: b. near Ashby-de-la-Zouch, Leicestershire, 1 July 1574; d. near Norwich, 8 Sept. 1656. While yet in college he published his ‘Virgidemiarum,’ a series of poetical satires, remarkable for elegant and energetic versification, strong and lively coloring and masterly traces of genuine humor. Having taken orders he obtained the rectory of Halsted, near Bury Saint Edmunds, where he published a very popular work, ‘A Century of Meditations.’ In 1616 he became dean of Worcester, and was raised to the see of Exeter in 1627. After the open rupture between the king and parliament, while conciliatory to the Puritans, he came forward in defense of the liturgy and discipline of the Church, against the views which the leading Non-Conformists had published, in a treatise called, after the initials of the names of its authors, ‘Smectymnuus.’ In the end of 1641 Bishop Hall was translated from the see of Exeter to that of Norwich, but was later imprisoned in the Tower with the other prelates who had protested against their expulsion from the House of Peers. In 1643 he was specially named in the ordinance passed for sequestering what were called “notorious delinquents” and his cathedral was desecrated and wrecked. His last 10 years were spent in retirement. His prose works edited by Philip Wynter were published in 1863. Among the latter, the best known and most popular is his ‘Contemplations,’ which still finds many readers. Consult ‘Life,’ by Lewis (1886).

HALL, Lyman, American patriot: b. Wallingford, Conn., 12 April 1724; d. Burke County, Ga., 19 Oct. 1790. He was graduated from Yale in 1747, studied medicine and began practice in Wallingford, Conn., but finally settled near Sunbury, Ga., where he became a leading physician. The settlers in this locality were from New England, and on the outbreak of trouble with England, they with Hall as leader took active part in the rebellion, though Georgia was slow in joining the patriot cause. Hall was sent by them as a representative to the Continental Congress, where he was admitted by a unanimous vote and took part in all debates, but did not vote when the vote was taken by colonies, until Georgia was represented as a colony. In 1776 it was so represented and Hall continued a member of the Congress till 1780, being one of those who signed the Declaration of Independence. He was elected governor of Georgia in 1783, and in an energetic administration of one year he did much to repair the damage done by the war, established land offices and schools, and then retired from public life. Consult Dwight, ‘Signers of the Declaration’ and an article, ‘Lyman Hall’ (in the *Magazine of American History,* XXV, 35).

HALL, Marshall, English physician and physiologist: b. Basford, near Nottingham, 18 Feb. 1790; d. Brighton, England, 11 Aug. 1857. In 1812 he took his degree in medicine at the University of Edinburgh. In 1817 he commenced practice at Nottingham, and shortly after rose to eminence. In 1826 he settled in London, where he carried on a most successful practice. He paid especial attention to the symptoms of illness; in 1817 published ‘Diagnoses of Diseases,’ and in 1824 his ‘Medical Essays’ appeared. His ‘Essay on the Circulation of the Blood’ (1831) contained an account of his discovery of the so-called “caudal heart” in the tail of the eel. The more important of his other writings are ‘Lectures on the Nervous System and its Diseases’ (1836); ‘Theory and Practice of Medicine’ (1837); ‘Theory of Convulsive Diseases’ (1848). His services to the cause of humanity were numerous and valuable, and among these one of the most widely known is the method which he invented of restoring suspended respiration, now generally adopted in the case of persons partially drowned. It is known as the “Marshall Hall Method.”

HALL, Robert, English Baptist clergyman: b. Arnesby, Leicestershire, England, 2 May 1764; d. Bristol, England, 21 Feb. 1831. He studied at the Baptist College at Bristol and King's College, Aberdeen, and entered the Baptist ministry, becoming in a few years not only the most prominent minister in his denomination but one of the very foremost of English pulpit orators. He was also widely known as a master of prose style, his most noted writings being ‘Apology for the Freedom of the Press’ (1793); ‘Modern Infidelity’ (1800); ‘Reflections on War’ (1802). He was subject to attacks of insanity, but in spite of this misfortune accomplished a vast amount of intellectual work and was a tireless student. His complete works in six volumes reached an 11th edition in 1853.

HALL, Robert, Australian naturalist: b. Lal Lal, Victoria, 1867. He was educated at the universities of Melbourne and Tasmania. In 1897 he accompanied the consul for Norway, in the capacity of naturalist, to Kerguelen Island. He also went to the headwaters of the Lena River, 2,500 miles. He was probably the first English-speaking naturalist to do so. There he collected a great number of specimens of birds and insects, which are now in the Tring Museum. He became curator of the Tasmanian Museum and the Botanical Gardens, Hobart, 1907, and secretary of the Royal Society of Tasmania, a position he resigned in 1913. Among his published works are ‘The Useful Birds of Southern Australia’; ‘Glimpses of Southern Australian Bird Life’; ‘Nature Studies in Australia’; ‘Insectivorous Birds of Victoria.’

HALL, Robert Henry, American soldier: b. Detroit, Mich., 15 Nov. 1837; d. Washington, D. C., 29 Dec. 1914. He was educated at West Point and served in the Federal army during the Civil War, and was in command of a brigade during the war in the Philippines. He became a brigadier-general in the United States army in 1901 and retired 15 Nov. 1901. He published ‘Register of the United States Army 1789–98’; ‘History of the Flag of the United States’; ‘History of United States Infantry Tactics’; ‘History of Fort Dearborn’; ‘Review of Works of United States History.’

HALL, Ruth, American novelist: b. Schoharie, N. Y., 10 April 1858. Besides more or less journalistic work she has written ‘In the Brave Days of Old’ (1898); ‘The Boys of Scrooby’ (1899); ‘The Black Gown,’ a novel of colonial Albany (1900); 'The Downrenter's Son,' a novel of the anti-rent troubles in New York State (1902); 'The Golden Arrow' (1901); 'The Pine Grove House' (1903).

HALL, Samuel Carter, English miscellaneous writer: b. Topsham, Devonshire, England, 9 May 1800; d. 16 March 1889. For over 40 years he was the editor of the *Art Journal*, which he founded in 1839. With his wife (Anna Maria) (q.v.) he published 'Ireland, its Scenery and Character' (1841–43); 'Book of Royalty' (1838); 'A Woman's Story' (1857); 'The Book of the Thames' (1859); 'A Companion to Killarney' (1878); and others. His separate works were 'A Book of Memories'; 'Book of British Ballads'; 'Baronial Halls'; 'Retrospect of a Long Life' (1883).

HALL, Thomas Cuming, American Presbyterian theologian: b. Armagh, Ireland, 25 Sept. 1858. He was graduated at Princeton University in 1879 and from Union Theological Seminary in 1882, and studied at Berlin and Göttingen in 1882–83. He was ordained in the latter year and held pastorates at Omaha, Neb. (1883–86), and Chicago (1886–97), and in 1898 became professor of Christian ethics at Union Seminary. In 1914 he was chosen to be Roosevelt professor at the University of Berlin during 1915–16. He was decorated with the Order of the Crown by the Emperor of Germany. He has written 'The Power of an Endless Life' (1893); 'The Social Significance of the Evangelical Revival in England' (1899); 'The Synoptic Gospels' (1900); 'John Hall, Pastor and Preacher: A Biography by his Son' (1901); 'Social Solutions in the Light of Christian Ethics' (1910); 'The History of Ethics within Organized Christianity' (1910); 'Historical Setting of the Early Gospel' (1912); 'Religion and Life' (1913).

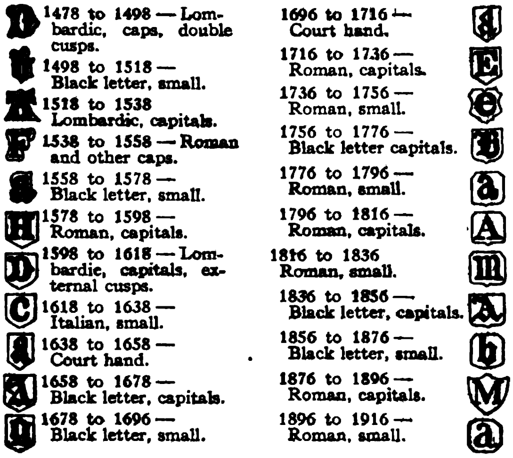
HALL OF FAME, a memorial to famous Americans, at the New York University. In March 1900 the institution received a gift of $100,000, afterward increased to $250,000, from a donor, whose name was withheld, for the erection and completion on University Heights, a beautiful site in upper New York overlooking the valleys of the Harlem and the Hudson, of a building to be called "The Hall of Fame for Great Americans." A structure was erected in the form of a terrace with superimposed colonnade 600 feet long connecting the University Hall of Philosophy with the Hall of Languages. On the ground floor is a museum 200 feet long by 40 feet wide, consisting of a corridor and six halls to contain mementoes of the names that are inscribed above. The colonnade has provision for 150 panels, each 2 feet by 8, each to bear the name of a famous American. Only persons who shall have been dead 10 or more years are eligible to be chosen. Fifteen classes of citizens are recommended for consideration: Authors and editors, business men, educators, inventors, missionaries and explorers, philanthropists and reformers, preachers and theologians, scientists, engineers and architects, lawyers and judges, musicians, painters and sculptors, physicians and surgeons, rulers and statesmen, soldiers and sailors, distinguished men and women outside the above classes. Fifty names were to be inscribed on the tablets at the beginning in 1900, and five additional names every fifth year thereafter, until the year 2000, when the 150 inscriptions will be completed. In case of failure to fill all the panels allotted, the vacancies are to be filled in a following year. In February 1904 the plan was announced of a Hall of Fame for Women near the former, with places for 50 tablets. The rules prescribed that the council of the university should invite nominations from the public. Every nomination seconded by a member of the university senate should be submitted to an electorate of 100 eminent citizens selected by the council. In October 1900 the university senate received the ballots of the electors. Of the 100 judges selected 97 voted. The number of names which had been submitted to them was 252. Of these each judge returned a vote for 50. The rule required that no candidate receiving less than 51 votes could be accepted. The returns showed that but 29 candidates received the required number and were chosen.

The 29 candidates elected on the first ballot (1900) and the number of votes received were as follows: George Washington, 97; Abraham Lincoln, 96; Daniel Webster, 96; Benjamin Franklin, 94; Ulysses S. Grant, 92; John Marshall, 91; Thomas Jefferson, 90; Ralph Waldo Emerson, 87; Henry Wadsworth Longfellow, 85; Robert Fulton, 85; Washington Irving, 83; Jonathan Edwards, 81; Samuel F. B. Morse, 80; David Glasgow Farragut, 79; Henry Clay, 74; Nathaniel Hawthorne, 73; George Peabody, 72; Robert E. Lee, 69; Peter Cooper, 69; Eli Whitney, 67; John James Audubon, 67; Horace Mann, 67; Henry Ward Beecher, 66; James Kent, 65; Joseph Story, 64; John Adams, 61; William Ellery Channing, 58; Gilbert Stuart, 52; Asa Gray, 51. The names of Bryant, Poe and Cooper were certain of election later. Lowell was not yet dead 10 years, so was not eligible. Bryant failed by 3 votes, Greeley by 5, Motley by 9. The most animated discussion was provoked by the selection of Robert E. Lee. The vote for him was not sectional, however, only a minority of the electors being Southern men.

In October 1905, under the rules, the university senate received the ballots of 95 electors out of 101 appointed. Of these only 85 undertook to consider the names of women. A majority of 51 was demanded, but in the case of the names of women, a majority of only 47. The following persons were elected: John Quincy Adams, 59; James Russell Lowell, 58; William Tecumseh Sherman, 58; James Madison, 56; John Greenleaf Whittier, 53; Mary Lyon, 58; Emma Willard, 50; Maria Mitchell, 48; to the hall for foreign-born Americans the three following were chosen: Alexander Hamilton, 88; Louis Agassiz, 83; John Paul Jones, 54. Among the names which received less than a majority vote in the 1905 election were those of Oliver Wendell Holmes, 48; Phillips Brooks, 48; Bryant, Parkman and Motley, 46 each; Poe and Cooper, 43 each; Bancroft and Greeley, 39 each; Nathaniel Greene and Mark Hopkins, 38 each; Joseph Henry, 32; Rufus Choate, 31. The hall was dedicated 30 May 1901, when 25 or more national associations each unveiled one of the bronze tablets in the colonnade. On 30 May 1907, the 11 new tablets were unveiled, orations being delivered by the governors of New York and Massachusetts.

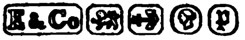
The third quinquennial election was held in 1910, when 11 new names were again added to as many tablets. They brought the total number to 51. Ninety-seven out of a possible 100 votes were cast by the board of electors, the number required to elect being, as in 1905. 51. The ballots of one professor of history, one publicist and one chief justice on the board of electors were not received. The persons selected were: Harriet Beecher Stowe, 71; Oliver Wendell Holmes, 69; Edgar Allan Poe, 69; James Fennimore Cooper, 62; Phillips Brooks, 60; William Cullen Bryant, 59; Frances E. Willard, 56; Andrew Jackson, 53; George Bancroft, 53; John Lothrop Motley, 51; and to the hall for foreign-born Americans was chosen Roger Williams, 64. Those failing of election by less than 10 votes were: Samuel Adams, 41 votes; Daniel Boone, 42; Patrick Henry, 44; Mark Hopkins, 45; Francis Parkman, 45; Charlotte Saunders Cushman, 45; Lucretia Mott, 41; Martha Washington, 43. There were 211 nominees. The fourth quinquennial election in 1915 secured the ballots of 97 electors, when nine names were admitted. The persons selected were: Alexander Hamilton, 70; Mark Hopkins, 69; Francis Parkman, 68; Elias Howe, 61; Joseph Henry, 56; Rufus Choate, 52; Daniel Boone, 52; Charlotte Cushman, 53. Of these Hamilton and Agassiz had been elected in 1905 to the separate hall proposed for famous Americans of foreign birth. When the Constitution was amended in 1914, to do away with the distinction between native-born and foreign-born, it was required that the four foreign-born, already chosen, be re-elected in competition with the native-born put in nomination. Hamilton and Agassiz were approved, while John Paul Jones and Roger Williams lacked a majority, but remain in nomination for the year 1920. In 1915 the hall received $37,000 toward its construction and endowment funds.

HALL MARKS, or **PLATE MARKS,** are symbols or marks placed on gold and silver plate for the purpose of showing its degree of purity, the place of manufacture, etc. In most European countries the stamping of plate is a matter of legal regulation. In England, Scotland and Ireland the marks are five in number — (1) The maker's mark or initials. (2) The assay mark. In the case of gold this is a crown with figures denoting the number of carats fine. For silver it is in England a lion passant, with figures; in Ireland a harp crowned; in Edinburgh a thistle; and in Glasgow a lion rampant. (3) The hall mark of the district offices, which are in London, York, Exeter, Chester, Newcastle, Birmingham, Sheffield, Edinburgh, Glasgow, and Dublin. (4) The date mark, consisting of a letter, changed every year. (5) The duty mark, the head of the sovereign, indicating that the duty has been paid.


1478 to 1498 — Lombardic, caps, double cusps.
1498 to 1518 — Black letter, small.
1518 to 1538 Lombardic, capitals.
1538 to 1558 — Roman and other caps.
1558 to 1578 — Black letter, small.
1578 to 1598 — Roman, capitals.
1598 to 1618 — Lombardic, capitals, external cusps.
1618 to 1638 — Italian, small.
1638 to 1658 — Court hand.
1658 to 1678 — Black letter, capitals.
1678 to 1696 — Black letter, small.
1696 to 1716 — Court hand.
1716 to 1736 — Roman, capitals.
1736 to 1756 — Roman, small.
1756 to 1776 — Black letter capitals.
1776 to 1796 — Roman, small.
1796 to 1816 — Roman, capitals.
1816 to 1836 Roman, small.
1836 to 1856 — Black letter, capitals.
1856 to 1876 — Black letter, small.
1876 to 1896 — Roman, capitals.
1896 to 1916 — Roman, small.

The foregoing table shows specimens of the different alphabets used by the Goldsmiths' Company of London as date-letters from 1478; variety in the shape of the shields being also used as a further distinction:

The accompanying figure shows a Birmingham silver plate-mark. (1) The maker's initials; (2) the standard mark; (3) the hall mark of Birmingham; (4) the duty mark; (5) the date letter for the year 1889.



HALL OF ODIN, a tradition among the Scandinavian peoples, which tells of the rocks from which the Berserkers, when tired of life, flung themselves into the sea; so named because they were regarded as the portals of the Scandinavian Valhalla.

HALLAM, hăl'am, **Arthur Henry,** English essayist: b. London, 1 Feb. 1811; d. Vienna, 15 Sept. 1833. He was a son of Henry Hallam (q.v.), and was graduated in 1832 from Trinity College, Cambridge, entered the Inner Temple and later the office of a conveyancer of Lincoln's Inn; and died suddenly during a visit to the Continent. At Cambridge he met Alfred Tennyson, whose 'In Memoriam,' through which he is best known, employs his sudden and untimely death as a basis for the exposition of a poet's philosophy. His 'Remains in Prose and Verse' (1834), largely justify the high hopes entertained for him, especially in the critique of Rossetti's 'Disquisizione sullo spirito anti-papale,' and the essay on Cicero. A most affecting 'Memoir' was printed by his father for private circulation; but Tennyson's 'In Memoriam' is his enduring monument.

HALLAM, Henry, English historian: b. Windsor, 9 July 1777; d. Penshurst, Kent, 21 Jan. 1859. He was educated at Oxford, and in 1818 made his appearance as an author by his 'View of the State of Europe during the Middle Ages,' which at once established his reputation and is acknowledged as a standard work. His next work, the 'Constitutional History of England' (1827), is justly regarded as a model at once of laborious research and scrupulous impartiality — an impartiality so scrupulous that his readers are perplexed to discover to which side his judgment inclines. His 'Introduction to the Literature of Europe' (1837-39), if it could not add to his reputation, certainly did not detract from it. His eldest son, Arthur Henry (q.v.), died in early manhood.

HALLBERG-BROICH, Theodor Maria Hubert, Reichsfreiherr von, German military officer and author: b. Jülich, 1768; d. 1862. He entered the army of the Elector of Bavaria; traveled extensively in Europe and western Asia, penetrating as far as Persia and after the conquest of Germany became so obnoxious to the French that he was imprisoned for eight months in Paris. After his release he set about recruiting an army in the Rhine-Maas district and on 6 Jan 1814 crossed the Rhine at Coblenz at the head of an army of 30,000. His works include 'Reise durch Skandinavien' (1818); 'Reise durch Italien' (1830); 'Frankreich und Algier' (1837); 'Reise nach dem Orient' (2 vols, 1839); 'Reise durch England' (1841); 'Deutschland, Russland, Kaukasus, Persien' (2 vols, 1844) He frequently employed the pseudonym of Eremit von Gauting. Consult Giftel, 'Leben des preussischen Generals Freiherrn von Hallberg-Broich' (Berlin 1863)

HALLÉ, hăl-lā, Sir **Charles**, Anglo-German pianist: b. Hagen, Westphalia, 11 April 1819; d. Manchester, England, 25 Oct. 1895. He studied first at Darmstadt, and afterward at Paris, where his reputation was established by his concerts of classical music. But the Revolution of 1848 sent him to England, and he made his home in Manchester. There he established in 1857 a series of subscription orchestral concerts which did much to raise the popular standard of musical taste by familiarizing the British public with the great masters of classical music. The orchestra which he conducted some 40 years was the most finely trained body of musicians in the United Kingdom. He was knighted in 1888, and married the same year the famous violinist, Madame Norman-Neruda.

HALLÉ, Lady **Wilhelmine Neruda**, violin virtuosa: b. Brünn, Austria, 21 March 1840; d. 15 April 1911. The daughter of a cathedral organist, she was trained by her father and the violin teacher Jansa, making her first appearance in Vienna in 1846 as an «infant prodigy.» In 1848 she played in London and subsequently spent several years in France, Germany and Russia. She married a Swedish musician named Norman in 1864, and adopted the name of Madame Norman-Neruda. She spent most of her time in England, playing mainly at the recitals of Sir Charles Hallé, whom she married in 1888.

HALLÉ, hăl'lĕ, or **HALLE AN DER SAALE**, ăn-dĕr-zä'lĕ, Germany, a town and important railway junction of six lines, in Prussian Saxony, about 20 miles northwest of Leipzig, on the river Saale and a cluster of small islands. It consists of the mediæval town with narrow, crooked streets and ancient dwellings, separated by boulevards on the site of the old ramparts, form extensive and handsome suburbs.. Among notable public buildings are the restored mediæval Rathaus; the «Red Tower» in the market place, a 15th century clock-tower; the decaying Moritzburg, formerly a citadel and archiepiscopal residence; the modern Gothic Ratskeller; the extensive buildings of the university (q.v.); a deaf and dumb asylum; a lunatic asylum; the 12th century Moritzkirche with fine wood carvings; the 16th century Protestant cathedral; and the 16th century Gothic Church of the Virgin, with four towers and noted for its handsome interior. In the suburb of Glaucha the Waisenhaus, «orphan house,» institution founded by the Reverend Francke about 1693 forms a small town in itself. Besides the orphan asylum it includes different grade schools, attended by between 3,000 and 4,000 pupils; a printing and publishing establishment; and a laboratory where medicines are prepared and sold. The trade and manufactures of Halle are extensive. The latter include starch, beet-root sugar, chemicals, oil, machinery, printing and publishing, besides the celebrated ancient salt works. The salt workers form a distinctive colony with special exemptions and privileges and are known as «Halloren.» The chief public utilities are municipally owned. Halle is mentioned as Halla as early as 806; in the 12th century it had developed considerable trade, and in the next two centuries was an important member of the Hanseatic League. In 1806 it was taken by the French; in 1813 it was annexed to Prussia. Pop. 180,834, mainly Evangelicals, Roman Catholics numbering nearly 9,000.

HALLÉ, University of, Germany, a celebrated institution founded in 1694 by King Frederick I in the interests of the jurist Thomasius, when he was followed to Halle by several students after his retirement from Leipzig owing to the envy of his fellow professors. It attained a high degree of prosperity, but owing to its strong Prussian proclivities was suppressed by Napoleon in 1806 and in 1813. It was re-established in 1815 and in 1817 was united with the University of Wittenberg. Its buildings, which are very extensive, especially those accommodating the medical faculty, date from 1832. There are faculties of theology, law, medicine and philosophy. From its foundation Halle was recognized as one of the principal schools of Protestant theology, and has numbered among its professors some of the most eminent names of Germany. Connected with the university is an ever-increasing library of over 270,000 volumes and MSS.; a medical and surgical clinical institute; a maternity hospital; an observatory; a theological and normal seminary; and a botanical garden; especial attention is devoted to agriculture. In 1913–14 the university had nearly 3,000 students.

HALLECK, hăl'ĕk, **Fitz-Greene**, American poet: b. Guilford, Conn., 8 July 1790; d. there, 19 Nov. 1867. At 18 he became a clerk in a New York bank, in which employment he remained for 20 years. For a long period after this he was the confidential agent of John Jacob Astor, and was named by him one of the original trustees of the Astor Library. In 1849 he retired to his native town. He wrote verses in his boyhood, but these early effusions were excluded from the collected editions of his poems. In 1819 he assisted Joseph Rodman Drake (q.v.) in the humorous series of 'Croaker' papers, contributed to the New York *Evening Post*. Drake's death in the succeeding year was commemorated by Halleck in a most touching poem. In 1819 was published Halleck's longest poem, 'Fanny,' a satire, in the measure of Byron's 'Don Juan,' on the fashions, follies and public characters of the day. From the variety and pungency of the local and personal allusions it enjoyed a great but fleeting popularity. In 1827 he published an edition of his poems in one volume, two of the best in the collection, 'Alnwick Castle' and 'Burns,' having been suggested by scenes and incidents of foreign travel. This edition also included the spirited lyric, 'Marco Bozzaris,' by which he will probably be longest kept in mind. Consult Wilson, ‘Life and Letters of Fitz-Greene Halleck’ (1869).

HALLECK, Henry Wager, American soldier: b. Westernville, N. Y., 16 Jan. 1815; d. Louisville, Ky., 9 Jan. 1872. He was graduated at the United States Military Academy in 1839; was assistant professor of engineering at West Point; was assistant to the Board of Engineers at Washington 1840–41, and in 1841–46 assistant engineer in the repair of the New York harbor fortifications. In the Mexican War he was on the Pacific Coast, and in 1847–49 was secretary of state for California under the military governments of Generals Mason and Riley. In 1849 he was a member of the California Constitutional Convention and of the committee which drafted the constitution of that State. After service as inspector and engineer of lighthouses (1852–54) and as engineer of the board for fortifications on the Pacific Coast (1853–54), he resigned from the service in 1854, and practised law in San Francisco. In 1855 he was president of the Pacific and Atlantic Railroad and in 1850–61 director-general of the Almaden quicksilver mines. On the outbreak of the Civil War he re-entered the army, and in November 1861, was appointed commander of the Department of the Missouri, then in a state of thorough disorganization. He quickly reduced the department to order, outlined the Western campaign of 1862, directed this campaign in person from 11 April, and took Corinth, with its 15 miles of entrenchments, on 30 May. In July he became general-in-chief of the armies of the United States; and henceforth directed from Washington the movements of the generals in the field, till, in March 1864, he was superseded by General Grant. Halleck was chief of staff till 1865, commanded the military division of the James in 1865, that of the Pacific, 1865–69, and that of the South from 1869 until his death. He wrote a work on ‘The Elements of Military Art and Science’ (1846), largely used as a manual in the Civil War; ‘Bitumen’ (1841); ‘A Collection of Mining Laws of Spain and Mexico’ (1859); ‘International Law, or Rules Regulating the Intercourse of States in Peace and War’ (1861; abgd. ed., 1886) and other volumes.

HALLECK, Reuben Post, American educator: b. Rocky Point, L. I., 8 Feb. 1859. He was graduated from Yale in 1881, was instructor in the Male High School, Louisville, Ky., 1883–96, and principal from the latter date. He has published ‘Psychology and Psychic Culture’ (1895); ‘The Education of the Central Nervous System’ (1896); ‘History of English Literature’ (1900); History of American Literature’ (1911); ‘New English Literature’ (1913); and (with Barbour) ‘Readings from Literature’ (1915).

HALLELUJAH, hăl-ẹ-loo'yạ, **HALLELUIA, or ALLELUIA** (Hebrew), “Praise ye the Lord”; an expression which occurs often in the Psalms, and which was retained when the Bible was translated into the various languages, probably on account of its full and fine sound, which, together with its simple and solemn meaning, so proper for public religious services, has rendered it a favorite of musical composers. The Roman Catholic Church does not allow it to be sung on the Sundays during Lent, on account of the mournful solemnity of the season; in that communion it is not sung again before Easter. It is no longer sung in masses for the dead as formerly. In the time of Augustine the African Church used this doxology only from Easter to the feast of Pentecost. The Greeks made an earlier or more common use of the Hallelujah than the Latin Church. The Jews call the Psalms cxiii–cxvii, the Great Hallelujah, because they celebrate the particular mercies of God toward the Jews, and they are sung on the feast of the Passover, and on the feast of Tabernacles.

HALLER, Albrecht von, äl'brĕHt fŏn häl'lĕr, Swiss anatomist, botanist and poet: b. Bern, 16 Oct. 1708; d. there, 17 Dec. 1777. Having chosen the medical profession, he went to the University of Tübingen, where he studied comparative anatomy under Duvernoy; and in 1725 removed to Leyden, then the first medical school in Europe. After extensive travels in England and France, he went to Basel in 1728 to study mathematics under Bernoulli. Here he first imbibed a taste for botany and composed his poem ‘Die Alpen,’ followed by various ethical epistles and other pieces, which gave him a reputation in Germany. In 1729 he returned to his native city, became in 1736 professor of anatomy, surgery and botany, in the newly-founded University of Göttingen, and through his influence the university was enriched with a botanical garden, an anatomical theatre, a school for midwifery and a college of surgery. In 1747 appeared the first edition of his ‘Primæ Lineæ Physiologiæ,’ which was long used as a textbook in schools of medicine. In 1752 he first advanced his opinions on the properties of sensibility and irritability as existing in the nervous and muscular fibres of animal bodies — doctrines which attracted much attention, and excited great controversies in the medical world. Disagreements with his colleagues induced him to return, in 1753, to Bern where he was elected a member of the sovereign council, and soon obtained by lot one of its magistracies. In 1758 he became director of the public salt-works at Bex and Aigle, and in the course of his superintendence introduced many improvements in the manufacture of salt. His later published works include ‘Elementa Physiologiæ Corporis Humani’ (1757–66); ‘Bibliotheca Botanica’ (1771); ‘Bibliotheca Anatomica’ (1774); ‘Bibliotheca Chirurgica’ (1774); ‘Bibliotheca Medicinæ Practicæ’ (1776–88). Haller is considered one of the greatest German poets of the 18th century. His philosophical and descriptive poems display depth of thought and richness of imagination. His ‘Elegiac Poems’ (Die elegischen Gedichte) are still frequently republished in Germany. He wrote in prose three philosophico-political romances — ‘Usong,’ ‘Alfred the Great,’ and ‘Fabius and Cato’ — designed to exhibit the respective advantages of different forms of government. Consult the ‘Life’ by Frey (1879).

HALLETT, Benjamin Franklin, American statesman: b. Barnstable, Mass., 2 Dec. 1797; d. Boston, 30 Sept. 1862. Graduated from Brown University in 1816, he studied law, was admitted to the bar, and was connected with the Providence (R. I.) press, but later went to Boston, and there became editor of the Boston *Advocate,* the official mouthpiece of the Anti-

Masonic party. From 1827 to 1831 he edited the Boston *Daily Advertiser*, which he made extremely unpopular through his vigorous enunciation of his views on Masonry, temperance and emancipation. He afterward became a Democrat and an influential factor in his party. For years he was chairman of its national committee, and it was he who drafted the Cincinnati platform of 1856. President Pierce, whose nomination he had helped to secure, appointed him United States district attorney in 1853.

HALLETTSVILLE, Tex., city, county-seat of Lavaca County, on the Lavaca River and San Antonio and Aransas Pass Railroad, about 100 miles southwest of Houston. It is in an agricultural and stock-raising region, and special attention is given to cotton and cattle. It has a cottonseed-oil mill and a number of cotton-gins. Large shipments are made each year of live-stock, cotton and cottonseed oil. Electricity and water plants are municipally owned. Pop. 1,379.

HALLEY, hăl'ĭ, **Edmund**, English mathematician and astronomer: b. Haggerston, near London, 8 Nov. 1656; d. Greenwich, 14 Jan. 1742. He was educated at Queen's College, Oxford. Before he was 19 he published 'A Direct and Geometrical Method of Finding the Aphelia and Eccentricity of Planets,' which supplied a defect in the Keplerian theory of planetary motion. By some observations on a spot which appeared on the sun's disc in July and August 1676, he established the certainty of the motion of the sun round its own axis. On 21 August, the same year, he fixed the longitude of the Cape of Good Hope by his observation of the occultation of Mars by the moon. In 1679 he published 'Catalogus Stellarum Australium,' and in 1683 his 'Theory of the Variation of the Magnetical Compass,' in which he endeavors to account for that phenomenon by the supposition of the whole globe of the earth being one great magnet, having four circulating magnetical poles or points of attraction. For the purpose of making further observations relative to the variation of the compass he set sail on a voyage in 1699, and having traversed both hemispheres arrived in England in September 1700. The spot at Saint Helena where he erected a tent for making astronomical observations is still called Halley's Mount. As the result of his researches he published a general chart, showing at one view the variation of the compass in all those seas with which English navigators were acquainted. He was next employed to observe the course of the tides in the English Channel, with the longitudes and latitudes of the principal headlands, in consequence of which he published a large map of the Channel. In 1703 he was elected Savilian professor of geometry at Oxford, and in 1721 he received the appointment of astronomer-royal at Greenwich, where he afterward resided, devoting his time to completing the theory of the motion of the moon. In the same year he began his observations, and for the space of 18 years scarcely ever missed taking a meridian view of the moon when the weather was not unfavorable. In 1752 appeared his 'Astronomical Tables'; and he was the author of a great number of papers in the 'Philosophical Transactions.' For the comet called by his name, see COMET.

HALLIWELL-PHILLIPPS, hăl'ĭ-wĕl-fĭl'ĭps, **James Orchard**, English antiquary and Shakespearean scholar: b. Chelsea, London, 21 June 1820; d. Hollingbury Copse, near Brighton, 3 Jan. 1889. He was educated at Cambridge. In 1839 he was elected Fellow of the Royal and Antiquarian societies. Gradually he came to concentrate his studies on Shakespeare alone, and more particularly on the facts of the poet's life, discrediting the internal evidence of the plays and sonnets, and devoting his attention to a minute and patient study of local tradition and the records of 32 towns besides Stratford. The successive editions of his 'Outlines of the Life of Shakespeare' (1848; 8th ed., 1889) recorded the growing results of his discoveries. Apart from Shakespeare, his 'Nursery Rhymes and Nursery Tales of England' (1845), and 'Dictionary of Archaic and Provincial Words' (1847; 6th ed., 1868) will keep his name from being forgotten. His magnificent folio edition of the 'Works of Shakespeare,' probably the richest storehouse extant of Shakespearean criticism (1853–65), was published at a price prohibitive to most students. To the Smithsonian Institution he gave (1852) a collection of accounts, inventories and bills illustrative of the history of prices current in the years 1650–1750. His principal Shakespearean collections went to the United States.

HALLOCK, Charles, American journalist and author: b. New York, 13 March 1834. He was graduated from Amherst in 1854, was editor of the New Haven *Register* in 1855–56, of the New York *Journal of Commerce* in 1856–61, of the Saint John (N. B.) *Telegraph and Courier* in 1863–65. In 1873 he founded *Forest and Stream* and in 1896–97 was editor of the *Northwestern Field and Stream*. In 1874 he founded the International Society for the Protection of Game and in 1875 formulated uniform game laws. He founded the town of Hallock, Minn., in 1880. He has done field-work and collecting for the Smithsonian Institution since 1860, and published numerous works, such as 'The Fishing Tourist' (1873); 'Camp Life in Florida' (1876); 'Vacation Rambles in Michigan' (1877); 'Dog Fanciers' Directory' (1886); 'Our New Alaska' (1886); 'The Salmon Fisher' (1890); 'Luminous Bodies Here and Hereafter' (1906); 'Hallock Ancestry' (1906); 'Peerless Alaska' (1908), and many pamphlets, monographs and articles on natural history, sport and other subjects. He was a son of Gerard Hallock (q.v.).

HALLOCK, Gerard, American journalist: b. Pittsfield, Mass., 18 March 1800; d. New Haven, Conn., 4 Jan. 1866. He was graduated from Williams College in 1819, in 1824 founded the Boston *Telegraph* (united with the *Recorder* in 1825), in 1827 purchased a part interest in the New York *Observer*, and in 1828 became associated with David Hale on the *Journal of Commerce*. A leader in journalistic enterprise, he started (1833) a pony-express between Philadelphia and New York, and operated the *Evening Edition*, a schooner which met incoming ships at Sandy Hook and brought foreign news. A pro-slavery man, he was a founder of the Southern Aid Society (1854), intended to succeed the American Home Missionary Society when the latter refused support to slave-holding congregations. In 1861 the *Journal of Commerce* was forbidden the use of the United States mails, and Hallock thereupon sold his interest, and never afterward wrote for the press. He was a founder of the Associated Press.

HALLOWE'EN, hăl-ō-ēn', or **HALLOW-EVEN,** the evening of 31 October, so called as being the eve or vigil of All Hallows, or festival of All Saints, which falls on 1 November. It is associated in the popular imagination with the prevalence of supernatural influences, and is clearly a relic of pagan times. In the north of England, hallowe'en is known as Nutcrack Night. In Scotland the ceremonies of the eve were formerly regarded in a highly superstitious light, and Burns' 'Hallowe'en' gives a humorous and richly imaginative presentment of the usual ceremonies as practised in Scottish rural districts in his day. The principal object of curiosity in consulting the future was to discover who should be the partner in life. Popular belief ascribed to children born on hallowe'en the faculty of perceiving and holding converse with supernatural beings.

HALLOWELL, Richard Price, American author and wool merchant: b. Philadelphia, 16 Dec. 1835; d. Medford, Mass., 5 Jan. 1904. He was prominent in the abolition movement, was appointed by Governor Andrew of Massachusetts special agent to recruit negro regiments, and subsequently was vice-president of the New England Woman Suffrage Association. He published 'The Quaker Invasion of Massachusetts' (1883), etc.

HALLOWELL, Me., city in Kennebec County, on the Kennebec River, and on the Maine Central Railroad, two miles south of Augusta and four miles north of Gardiner. The first permanent settlement was made in 1754. It was incorporated as a township in 1771, and chartered as a city 29 Aug. 1850. At the time of its becoming a chartered city it included within its limits Chelsea, Manchester and Farmingdale. The city is governed by a mayor and a council of seven members elected annually. The waterworks are operated by the city. The industries of the city include granite works, shoe manufactories, glue works, cotton goods, machinery, etc. The Hubbard Free Library and the Maine State Industrial School for Girls are public institutions. Pop. 3,000.

HALLOYSITE. A clay-like aluminum silicate resembling kalonite but amorphous and containing larger but variable proportions of water. Probable composition, $Al_2O_3SiO_2.2H_2O$. Mostly white but some is brown or pink. It is a source of aluminum and used for manufacture of pottery. It is mined at Sulphur Springs, Dekalb County, Ala., and occurs at Stevenson and near Celera in that State. Also in California and is mined near Mono Lake. Has been mined at various places in Georgia, notably in Dade County. See CLAY.

HALLSTATT EPOCH, a name taken from the necropolis of Hallstatt, Upper Austria, not far from Salzburg, and applied to that culture in Europe — parts of Germany, France, Italy and in Switzerland, Bohemia, etc.— distinguished as the last bronze and first iron stage, dating back at least as far as 1000 B.C. According to some ethnologists in the eastern highlands of the Alps this culture was of a higher evolution than that of a partially Oriental cast in the west during the Neolithic epoch.

HALLSTRÖM, Ivar, ē'vär hĕl'strêm, Swedish composer: b. Stockholm, 5 June 1826; d. there, 11 April 1901. He studied law at Upsala, then turned his attention to music. In 1861–72 was director of the institute founded by Lindblad, and from 1881 instructor to the Royal Opera. His works include the operas 'Den Bergagna' ('The Mountain King,' 1874); and 'Neaga' (libretto by Carmen Sylva, 1885); cantatas, numerous songs, and an 'Idyl' for orchestra, chorus and solo voices, for which he received (1860) a prize from the Stockholm Musical Union.

HALLSTRÖM, Per, Swedish short-story writer: b. Stockholm, 29 Sept. 1866. Pursued courses at the Higher Technical School in his native city (1883–87), and spent three years in America (1887–90), where he seems to have come in contact chiefly with the poorer classes, with whom a number of the short stories written after his return to Sweden deal. He held a position in the Stockholm post office from 1890 to 1897, but has been devoting his time since then to travel and to writing. He published his 'Lyrics and Phantasies' in 1891; then two volumes of short stories, 'Vilsna Fåglar' ('Birds Astray,' 1894), from which are taken two stories that have been translated into English ('Doctor Braun,' *The New Review,* New York, November 1913, and 'Symposium,' in *The American-Scandinavian Review,* New York, November 1913) and 'Purpur' ('Purple,' 1895); 'Resboken' ('A Book of Travel' 1898); 'Thanatos' (1900). He is also the author of a rather delicate comedy of modern social life, 'Erotikon.' His work is all of it smooth and elegant, pessimistic, but artistic in the extreme. In addition to the two short stories mentioned only two others may be found in English, in the files of the *New York Call* for 1914: 'From Out of the Dark' and 'A Letter to My Uncle.'

JACOB WITTMER HARTMANN.

HALLUCINATIONS, are morbid conditions of mind in which the patient is conscious of a perception without any impression having been made on the external organs of sense. Hallucinations are to be distinguished from delusions, for in these there are real sensations, though they are erroneously interpreted. All the senses are not equally subject to hallucinations; the most frequent are those of hearing; next, according to many, come those of sight, smell, touch and taste; and hallucinations of several senses may exist simultaneously in the same individual. They may also be complicated with certain delusions. Often even the hallucination of one sense is confirmed by the delusion of another, so that it is neither possible nor necessary always to distinguish hallucinations from delusions. The simplest form of hallucinations of hearing is the tingling of the ears; but the striking of clocks, the sounds of musical instruments and of the human voice are often heard, and in these instances, as in those of the perturbations of the other senses, there must be a diseased sensorium, though there should be no structural derangement of the nerves. Hallucinations are not confined to those whose mental faculties have been alienated, but occasionally assail and torment even the sane. The second Earl Grey was haunted by a gory head, but he could dismiss it at will. Swedenborg had a similar faculty; and Bernadotte, king of Sweden, was besieged in his rides by a woman in a red cloak, being perfectly conscious of the hallucination under which he labored. Lord Brougham proposed that the existence of hallucinations should be established as an authoritative test for the existence of insanity; but, as will have been seen, this would be no test at all. The proportion of the hallucinations of the various senses has been by some tabulated thus:— hearing, 49; vision, 48; taste, 8; touch, 3; smell, 1. All are more frequent in mania than in monomania, and in mania errors of vision are more numerous than those of hearing. There is a growing conviction that many so-called hallucinations and delusions are not really such, but due to an abnormal ability of the sufferer to sense vibrations far above the normal. The study of clairvoyance and clairaudience indicates that a considerable number of individuals do sense things above the mass of mankind. A study of theosophy and the theory of the astral plane is very interesting in this connection. Consult Parish, ‘Hallucinations and Illusions’ (1901); Podmore, ‘Studies in Psychological Research’ (1897). See APPARITIONS; DREAMS; GHOSTS; INSANITY.

HALLUX VALGUS, a deformity of the great toe consisting of a turning of the toe toward its neighbor, with a marked enlargement of the head of the bone. The synovial sac on the inner side of the toe is often chronically inflamed from constant pressure, forming a bunion. Advanced cases may require the excision of the bony outgrowths, but early cases may be relieved by a properly adjusted shoe.

HALMAHERA, häl-mä-hä'rä. See GILOLO.

HALM, Friedrich, pseudonym for Eligius Franz Joseph Freiherr von Münch-Bellinghausen (q.v.), Austrian dramatist and short-story writer.

HALO, a luminous circle, the result of light refracted from minute bodies, which is seen under various conditions, the most common being colored circles around the sun and moon. They are subject to variation in form, double and triple circles being seen, concentric or superposed in a pattern, and sometimes accompanied by arcs and spokelike radii. The corona, sun-dog, mock-moon, parhelion, etc., are of this character. The typical solar or lunar halo is reddish in the inner edge, and violet on the outer circumference, but when there is a double halo this coloring is reversed in the larger one, exhibiting diffraction. Sun and moon halos are mainly attributed to minute ice-crystals in the earth's atmosphere, but may be due to other interference with light. A thorough study of the diffraction of light is essential to a full understanding of the phenomena. Halos are seen at fixed distances from the sun, 22 and 46 degrees, respectively, while corona are at variable distances. See LIGHT; CORONA; PARHELION; SUN.

The halo of art, also called nimbus, is a disc or approximately circular display of light around the head in a painting, usually of the Christ, the Virgin Mary or a saint. Occasionally it takes the form of light rays extending from the head. Again at times it encircles an entire figure, usually in an ellipse, and is then commonly called aureole, a more appropriate name, as it is undoubtedly an effort to express the aura of the subject of the picture, such aura being assumed to be luminous in one of saintly character. (See AUREOLA). The halo was early adopted by painters of sacred subjects, and adorns the paintings of a vast number of figures in cathedral windows. Consult Cherrill, ‘The Theory of Halos and Parhelia’; United States Weather Bureau Bull. 12 (1895); *Monthly Weather Review* (Washington, D. C.).

HALOGEN, hăl'ŏ-jĕn, in chemistry, an element, or inorganic radical, which unites directly with a metal to produce electrorogative saline compounds. The term is usually confined to the elements flourine, chlorine, bromine and iodine, and the compound known as cyanogen. Their hydrides are colorless, fuming gases, easily soluble in water, with a strong acid reaction.

HALOPHYTES, hăl'ŏ-fīts, plants which thrive in salt marshes in soil rich in salt, alum, etc. When burned these yield barilla or soda-ash, as *Salsola* (saltwort), *Salicornia* and *Chenopodium*. See BEACH-PLANTS and DESERT PLANTS.

HALPINE, Charles Graham, American soldier and author: b. Oldcastle, County Meath, Ireland, 20 Nov. 1829; d. New York, 3 Aug. 1868. After study at Trinity College, Dublin, he came to Boston, Mass., in 1851, was there assistant editor of the *Post*, and with B. P. Shillaber began the *Carpet Bag*, an unsuccessful humorous periodical. Later Washington correspondent of the New York *Times*, he then went to New York, where he was connected with the *Herald*, and wrote much matter for magazines. Upon the outbreak of the Civil War he enlisted in the 69th New York Volunteer Infantry, and was afterward on the staff of General Hunter as assistant adjutant-general, of General Halleck with the rank of colonel. In 1864 he resigned from the service and was brevetted brigadier-general of volunteers. He was best known for his burlesque verses, written in the character of an Irish private, «MILES O'REILLY,» over which pseudonym they appeared. ‘Life and Adventures, Songs, Services and Speeches’ was published in 1864, and his complete ‘Poetical Works’ in 1869.

HALS, häls, **Frans,** Dutch painter, the founder of the Dutch genre school: b. Antwerp, about 1584; d. Haarlem, 7 Sept. 1666. When young he went to Haarlem, where he studied painting under Karel van Mander, and he was one of the civic guard, director of an art school and chief of the painters' guild. His first dated work is a portrait belonging to the year 1613, his next, the ‘Banquet of the Officers of the Haarlem Corps of Arquebusiers of Saint George’ (1616), one of the earliest pictures belonging to the Dutch school of genre painting, of which Hals is sometimes regarded as the founder. He executed ‘The Jolly Trio,’ ‘Herring Vender’ and ‘Fool Playing a Lute,’ and seems to have found in genre painting a scope and a possibility of humor much to his taste. He executed also many single-figure pieces, as ‘The Laughing Cavalier,’ and ‘Hille Bobbe’ (National Gallery, Berlin; replica in the

Metropolitan Museum), and numerous portraits, all of high value artistically. «Franz Hals,» says James Northcote, R. A., «was a great painter; for truth of character, indeed, he was the greatest painter that ever existed. He made no beauties; his portraits are people such as we meet every day in the streets.» Adrian van Ostade, Wouwerman, and Adrian Brouwer were among his pupils. He is said to have been improvident in his habits, and latterly received a pension from the municipality of Haarlem. His brother Dirk, d. Haarlem, May 1656, and his son, Frans Hals, the Younger, b. about 1620; d. about 1669, were also excellent painters. Consult biographies by Davies (1902), Moes (1909) and Peladan (1912).

HALSEY, Francis Whiting, American author and editor: b. Unadilla, N. Y., 15 Oct. 1851. He was graduated at Cornell University in 1873. He was a member of the New York *Tribune* staff 1875–80, and of the New York *Times* 1880–1902, edited the *Times Saturday Review* from its first number 15 Oct. 1896 until 1902. He was literary adviser of D. Appleton and Company 1902–05, and of the Funk and Wagnalls Company since 1905. He has lectured before New York and New Jersey historical societies and at Columbia and Princeton universities. He has published ‘Two Months Abroad’ (1878); ‘The Old New York Frontier’ (1901); ‘Virginia Isabel Forbes,’ memoir of his wife (1900); ‘Our Literary Deluge’ (1902); ‘The Pioneers of Unadilla Village’ (1902); biographical and historical introduction to Mrs. Rowson's ‘Charlotte Temple’ (1905); historical introduction and foot notes to Richard Smith's ‘Tour of Four Great Rivers’ (1906). He is editor of ‘American Authors and Their Homes’ (1901); ‘Authors of Our Day in Their Homes’ (1902); ‘Women Authors of Our Day in Their Homes’ (1903); ‘Of The Making of a Book’ (1904); ‘The World's Famous Orations,’ with W. J. Bryan (10 vols., 1906); ‘The Best of the World's Classics’ (10 vols., 1907); ‘Great Epochs in American History’ (10 vols., 1912); ‘Seeing Europe with Famous Authors’ (10 vols., 1914); ‘Balfour, Viviani and Joffre, Their Speeches in America’ (1917).

HALSTED, George Bruce, American mathematician: b. Newark, N. J., 25 Nov. 1853. He was graduated from Princeton in 1875 and from 1884 to 1903 was professor of mathematics in the University of Texas. He was professor of mathematics at Kenyon College, Ohio, 1903–06; and at Colorado State Teachers College 1906–12. He was awarded a fellowship by the Royal Astronomical Society of London. He devoted himself to the dissemination of a knowledge of non-Euclidean geometry and to this end published translations of Bolyai (1891), Lobachevsky (1891), Saccheri (1894) and Poincaré (1906, 1913). He wrote on mathematics, philosophy and formal logic for a number of scientific magazines, was a collaborator in preparing ‘The Century Dictionary and Cyclopedia,’ and has published ‘Mensuration’ (1881); ‘Elements of Geometry’ (1885); ‘Elementary Synthetic Geometry’ (1892); ‘Pure Projective Geometry’ (1895); ‘Rational Geometry’ (1904); ‘Géométrie rationale’ (Paris 1912); ‘On the Foundation and Technic of Arithmetic’ (1912); and 90 books and memoirs cited in ‘Bibliography of Non-Euclidean Geometry,’ by D. M. Y. Sommerville (London 1911).

HALSTEAD, Murat, American journalist: b. Ross, Butler County, Ohio, 2 Sept. 1829; d. Cincinnati, Ohio, 2 July 1908. At 18 he began writing for newspapers, studied at Farmers' College, near Cincinnati, and did local newspaper reporting on several Cincinnati papers. In 1853 he became manager of a department on the Cincinnati *Commercial*. The following year he acquired a pecuniary interest in the paper, which began rapidly to increase in circulation and influence. The *Commercial* combining with the *Gazette*, its rival, the Cincinnati *Commercial-Gazette* became the recognized organ of the Ohio Republicans. In 1890 he removed to Brooklyn, N. Y., where he edited the *Standard Union*. Later he was a contributor to magazines and as a special correspondent went to the Philippines during the Spanish-American War. He wrote ‘The Story of Cuba’; ‘Life of William McKinley’; ‘The Story of the Philippines’; ‘History of American Expansion’; ‘Life of Admiral Dewey’; ‘The Boer and British War’; ‘The War Between Russia and Japan’ (1905), etc.

HAM, one of the three sons of Noah, from whom the earth after the Deluge was peopled. He is first mentioned between the other two — Shem, Ham and Japheth; but afterward is expressly designated the younger son of Noah, that is, relatively to the other two. He had four sons — Cush, Mizraim, Phut and Canaan. The three first traveled southward, and from them chiefly sprang the tribes that peopled the African continent, as Canaan became the father of the tribes that principally occupied the territory of Phœnicia and Palestine. Ham is also used as a designation of Egypt, probably on account of its population having sprung from a son of Ham, and the name Ammon, by which the chief god of the northern Africans was often called and worshipped, may very likely derive its origin from the same source.

HAM, the joint which unites the thigh and the leg of an animal, but more generally understood to mean the cured thigh of the hog. Ham-curing is now an important branch of business, especially in Great Britain and America, and the details of the process are generally the same everywhere. The meat is first well rubbed with salt, and a few days after it is rubbed again with a mixture of salt, saltpetre and sugar, though sometimes the saltpetre is omitted. After lying in the tub for 8 or 10 days it is ready for drying. Wet-salting requires three weeks and dry-salting four. The smoking of hams is carried on in smokehouses, the meat being hung as high as possible and subjected to the smoke of a fire kindled on the ground-flat, and which ascends through holes in the flooring. The process of smoking is for the most part carried on in winter, the fire being kept in a smouldering state for five or six weeks. Wood is used in preference to coal in the process of smoking. See Pork.

HAM-BEETLE, or PAPER-WORM, a small clerid beetle (*Necrobia rufipes*), sometimes a pest of considerable importance because of the occurrence of its larvæ or «worms,» the paper-like cocoons and beetles on hams in such numbers as to render them unmerchantable. Its injuries are generally confined to the exterior and are due to carelessness in packing and to the cracking of the ham coverings. This is one of three cosmopolitan species of the same genus, all of which are carnivorous scavengers.

HAM-FLY, a name of the cheese-fly (q.v.), due to the occasional appearance of its maggots or «skippers» in the fatty exterior portions of preserved hams.

HAMA, hä'mä, or **HAMAH,** Syria, the Biblical HAMATH, a very ancient city, on the El-Asi (Orontes), 110 miles northeast of Damascus. It is surrounded by gardens and has narrow, crooked streets, with houses built of timber and sun-dried bricks. There are manufactures of yarn and coarse woolens, and a general domestic caravan trade. Hamath is frequently mentioned in Old Testament history as in conflict with the Assyrians; first as early as 854 B.C. After the Græco-Macedonian conquest it became known as Epiphania. In 639 it was captured by the Moslems. Abdulfeda, the Arabian geographer, was Prince of Hama from 1310–31. In 1812 Burckhardt here discovered the four Hittite stones, the inscriptions of which are still undeciphered. Pop. 45,000.

HAMADRYAD, hăm'ą-drī-ăd. (1) A baboon. (2) The king-cobra (*Naja bungarus*), one of the Oriental cobras, found from southern India to China and the Philippines, and closely allied in structure, markings and habits to the cobra di capello, but much larger, reaching the length sometimes of 13 feet, making it the longest of venomous serpents. It is also the most fierce in disposition, but fortunately is nowhere common and feeds wholly on other snakes. Consult Fayrer, 'Thanatophidia of India' (1874).

HAMADRYADS, in Greek mythology, the eight daughters of Hamadryas. They received their names from trees and are the same as the Dryads (q.v.). They were conceived to inhabit each a particular tree, with which they were born and with which they perished.

HAMAMELIS. See WITCH HAZEL.

HAMAN, hä'mąn, a minister of the Persian king Ahasuerus. Because Mordecai the Jew refused to pay him homage, he resolved on the destruction of all the Jews in the Persian monarchy. By falsehood and intrigue he succeeded in obtaining a decree for this purpose; but Esther, the Jewish consort of Ahasuerus, interposed for their deliverance and Haman was hanged on the very gibbet he had caused to be prepared for Mordecai. His history is given in the book of Esther.

HAMATH, hā'măth. See HAMA.

HAMBLIN, Joseph Eldridge, American soldier: b. Yarmouth, Mass., 1828; d. New York, 3 July 1870. Not long after the commencement of the Civil War he became adjutant of the 5th New York, later was transferred to the 65th, whose commander he soon became, and with which he participated in Sheridan's victorious movements in the Shenandoah. For services at Cedar Creek he was brevetted brigadier-general and was mustered out in 1866 with full rank of brigadier and brevet of major-general. Subsequently he was active in the affairs of the New York State National Guard.

HAMBLIN, Thomas Sowerby, American actor: b. Pentonville, near London, England, 14 May 1800; d. New York, 8 Jan. 1853. He was early a member of the corps of the Sadler's Wells and Drury Lane theatres, was a tragedian at Bath, Brighton and Dublin, came to the United States in 1825, appeared at the Park Theatre, New York, and acted in leading American cities. He was manager of several New York theatres, and among his rôles were those of Macbeth, Hamlet, Othello, Rolla, Pierre, Virginius and Coriolanus. He was esteemed second only to Forrest and the elder Booth, and made the standard drama a feature of his management, under which the Bowery Theatre saw its historic days.

HAMBURG, hăm'bėrg (Ger. häm'boorg), Germany, one of the constituent states of the empire, officially named Freie und Hanse-Stadt Hamburg. Its area is 157.18 square miles, of which 30 square miles are comprised in the city of Hamburg. The greater portion lies on the lower Elbe between Schleswig-Holstein on the north and Hanover on the south. It is divided into five parts — the metropolitan district and four demains, viz., the Geestlande, Bergedorf, Marschlande and Ritzebüttel, with Cuxhaven. It includes also several islands in the Elbe, Moorburg (within Hanover) and other small enclaves within Hanover, and the island of Neuwerk in the North Sea. Under its constitution the state of Hamburg is a republic. The present constitution came into force in 1861; revised in 1879 and 1906. The government is entrusted, in common, to two chambers of representatives, the Senate and the Bürgerschaft, or House of Burgesses. The Senate, which exercises chiefly, but not entirely, the executive power, is composed of 18 members, one-half of whom must have studied law or finance, while seven of the remainder must be merchants. The members of the Senate are elected for life by the House of Burgesses; but a senator may retire at the end of six years. A first and second burgomaster, chosen annually by ballot, preside at the sessions of the Senate. No burgomaster can be in office longer than two years, and no member of the Senate may hold any other public office. The Bürgerschaft consists of 160 members, 80 of whom are elected by ballot by all tax-paying citizens. Of the remainder, 40 are chosen by ballot, by the owners of house property, while the other 40 are chosen by ballot by burgesses who are or have been members of the Senate or of the House of Burgesses or members of various guilds, corporations or courts of justice. All members of the lower house are chosen for six years, in such a manner that every three years new elections take place for one-half the number. In all matters of legislation, except taxation, the Senate has a veto; and, in case of a constitutional conflict, recourse is had to an assembly of arbitrators, chosen from both houses; also to the Supreme Court of the empire at Leipzig. The jurisdiction of the Free Port was restricted on 1 Jan. 1882 to the city and port and in 1888 the whole of the city except the actual port and the warehouses connected with it was incorporated in the Zollverein. A small area at Cuxhaven is still outside the Zollverein. For 1915 the ordinary revenue was $41,106,480 and expenditure, $67,-

534,300. For 1918 the budget estimated revenue is placed at $49,475,510 and expenditure at $60,451,125. Direct taxes amount to nearly half the whole revenue, and next to that the proceeds of domains, quays, railways, etc. Expenditure for the debt totaled $16,971,625 in 1918 and for education, $7,017,150 was spent in 1915, but only $3,964,763 in 1917. The public debt on 1 Jan. 1914 was $210,560,355. The population in 1880 was 453,869 and on 1 Dec. 1910 was 1,014,664. In 1912 the four domains outside the city had a population of 88,610 and the city 986,804. In 1910 there were 28,675 foreigners; also there were 930,071 Protestants (91.66 per cent), 51,036 Roman Catholics (5.03 per cent), 3,942 other Christians (0.39 per cent), 19,472 Jews (1.92 per cent) and 10,143 of other persuasions (1.00 per cent). In 1913 there were 249 public elementary schools with 3,911 teachers and 122,364 pupils; 20 higher state schools with 12,155 pupils and 78 private schools with 20,096 pupils. The principal towns of the state outside the city of Hamburg are Bergedorf (14,907), Cuxhaven (14,888) and Ritzebüttel (3,140).

The city was founded by Charlemagne, who, between 808 and 811, built a citadel and a church on the heights between the Elbe and the east bank of the Alster as a bulwark against the neighboring pagan Slavs. In 831 it became an episcopal see. It was frequently devastated by Danes and Slavs, but in the 12th century had become an important commercial city, and in 1241 and 1249 combined with Lübeck and Bremen in forming the Hanseatic League. It was declared an imperial city by Maximilian in 1510, but was not formally acknowledged until 1618. During the Thirty Years' War its population and prosperity increased owing to the immunity of its position, and in the following century extensive commercial relations with North America were developed. In 1810 it was incorporated in the French Empire as the capital of the department of the Mouths of the Elbe, but was occupied by the Russians in 1813. They were driven out by the French under Davoust, two months later, and the city underwent severe financial spoliation at the hands of the conqueror and extensive depopulation. In 1815 it became an independent state of the German federation, forming with Lübeck, Bremen and Frankfort, the curia of the free cities. Its trade and importance have increased ever since. In 1871 it united with the German Empire as a free city-state; but did not join the Zollverein or German Customs Union until 1888. Consult the works referred to under the city of Hamburg.

HAMBURG, Germany, a free city of northwestern Germany. The city occupies 30 square miles of the state of Hamburg's total area of 157.18 square miles. The city is the greatest commercial port on the European continent, the chief of the three Hanse towns and the seat of the upper Hanseatic court. It is situated at the junction of the Alster and the Bille, on the right bank of the northern branch of the Elbe, about 93 miles from the North Sea and 178 miles by rail from Berlin. With its connecting suburbs, Altona and Ottensen, it has a river frontage of over five miles. The river is spanned by two fine bridges and there are numerous bridges across the canals which intersect the east and lower part of the city in all directions, and across the Alster which flows through the city and forms two ornamental pieces of water, the Aussen-Alster and the Binnen-Alster or Alster-Bassin. The latter is surrounded by fine quays, the Alter Jungfernstieg and the Neuer Jungfernstieg, lined with handsome residences, hotels and stores, and constituting the chief thoroughfare in the city. The harbor accommodation is extensive; the principal quays along the Elbe where the ocean steamships lie are the Kaiser-Quai and the Sandthor-Quai. The boulevards or Anlagen occupy the site of the ancient encircling walls, removed since 1815. The modern portion of the city, rebuilt since the destructive fire of 1842 in a magnificent and expensive style, is in striking contrast to the older low-lying portion, with its back streets, bordered by warehouses, and the meaner class of dwelling-houses. The most important public buildings are the Exchange, a noble edifice consisting chiefly of a magnificent hall surrounded by a fine colonnade and containing a large commercial library of over 120,000 volumes, the modern Rathaus in Renaissance style, and the Deutsches Schauspielhaus. Among ecclesiastical structures are the 19th century Gothic church of Saint Nicholas with a tower and spire 473 feet high; the 18th century Renaissance church of Saint Michael's, with a spire 426 feet high; the 15th century church of Saint Catherine's, the 14th century church of Saint James and a fine Jewish synagogue. Besides the numerous private and public schools the educational institutions include the Johanneum institution, founded in 1528, containing a college, museums and the city's extensive library; the Kunsthalle with a large art collection; and zoological and botanical gardens, etc. Among its public monuments noteworthy are the statue of Lessing by Schafer; the monument to the sons of Hamburg who fell in the war with France in 1870, by Schilling; and the Hansa fountain. Among the many charitable and benevolent institutions are well-endowed hospitals, orphan and insane asylums, and there is also an organized system of municipal poor relief. The sewerage system has been modernized and the general sanitary conditions improved, especially since the severe choleraic epidemic of 1892. The municipal waterworks, dating from 1531, have been added to at various dates and a modern filtering plant installed since 1893; garbage is burned in municipal crematories; the streets are well paved and are kept very clean; municipal bath and wash houses are maintained; food adulteration is keenly looked after; the gas and electric-lighting plants are civic property, and a large revenue is obtained from the electric street railroads, which are operated by private companies, paying state subventions.

The importance of Hamburg is due to its great marine commerce, which has been facilitated by the engineering enterprises of the inhabitants in deepening the bed of the river, cutting canals and since 1890 in the construction at Cuxhaven, at the mouth of the river, of enormous docks. The dock and harbor facilities are the most complete in the world. Seven railroad lines enter the city, which is connected also by rivers and canals with nearly all parts of the German Empire. In 1913 14,054 vessels with a net tonnage of 13,141,362 tons entered, and 13,745 with a net tonnage of 10,324,437 cleared the port. The exports by sea in 1913 amounted to $966,225,000; the imports by sea in the same year were approximately $1,179,050,000. Raw materials, foodstuffs, especially coffee, yarn, tobacco, wine and manufactured articles are the chief imports; the principal exports are coffee, sugar, cotton, ironware, hosiery, machinery, paper and tobacco. Seagoing vessels (exclusive of fishing vessels), above 17.65 registered tons, belonging to Hamburg in 1913 numbered 1,434 of 1,797,508 tons, with 35,702 in the crews. The city's manufacturing interests, though large, are less important, including shipbuilding, iron-founding, tobacco and cigar making, sugar refining, distilleries, breweries, flour-milling, furniture, pianos and musical instruments, optical apparatus, leather, ivory articles and numerous other domestic industries. The banking, exchange and marine assurance business of Hamburg has been on an extensive scale since the establishment of the Hamburg giro-bank in 1619, and is one of the most important in the world.

Insurance is compulsory for every householder and there is a municipal employment bureau and a municipal pawnshop established in 1650. The population of the city is second to that of Berlin in the German Empire; in 1910 it was 986,804. See HARBORS, DOCKS AND BREAKWATERS.

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HAMBURG, Bank of. Established 1619, 10 years later than the Bank of Amsterdam and on the same plan, both of them following the matured organization of the Bank of Venice, which latter was indebted to the experience of the Greek and Roman banks of antiquity. As this view appears to be questioned by Blanqui (‘History of Political Economy,’ ed. 1880, p. 323), it will perhaps be sufficient to cite Beckmann (‘History of Inventions,’ ed. 1846, II, p. 4, seq.) who recalls the tabernæ argentariæ, or mensæ nummulariæ of the Romans, or «banking houses, into which the state and the wealthy classes caused their revenues to be paid and upon which they gave to their creditors orders (cheques, or bills of exchange), for the payment of their claims in money. . . . Similar banking houses arose in the Italian states about the year 1377. They were called apothecæ seu casanæ generis.» All of these banks were chartered by the Papal government, the first by Pope Sixtus IV of a bank or lending-house at Savona, near Genoa, in 1472. The attempt to destroy Lorenzo di Medici by preaching a violent crusade against the Jewish community of Italy, both belong to the history of banking and are given at some length by Beckmann. See AMSTERDAM, BANK OF; VENICE, BANK OF.

HAMBURG FOWLS. See POULTRY.

HAMID, Abdul, Sultan of Turkey: d. Constantinople, 10 Feb. 1918. See ABDUL HAMID II.

HAMILCAR, hă-mĭl'kạr, a name of common occurrence at Carthage, and borne by several of its most distinguished citizens, among whom the chief was HAMILCAR BARCA («lightning») : b. Carthage; d. Spain, 228 B.C. He was the father of the celebrated Hannibal. While a young man he was appointed to the command of the Carthaginian forces in Sicily, in the 18th year of the First Punic War, 247 B.C. He established himself with his whole army on Mount Hercte (now Monte Pellegrino), where he not only succeeded in maintaining his ground, but sent out squadrons to plunder the coasts of Sicily and Italy. In 244 he quitted his strong position, and, landing at the foot of Mount Eryx, converted the town of that name into a fortified camp for his army. For two years he defied all the efforts of the Romans to dislodge him; but the Carthaginian admiral, Hanno, having been totally defeated off the Ægate Islands, 241 B.C., he reluctantly consented to withdraw from Sicily. His inability to perform the promises, which to keep them in obedience he had made to his mercenary troops brought about their revolt after returning from Sicily, and as they were joined by almost all the native Africans Carthage was brought to the brink of ruin. The incapacity of Hanno, who had been entrusted with the suppression of the revolt, led all parties to concur in the appointment of Hamilcar. He defeated the enemy with great slaughter, reduced their towns to subjection, and after several alternations of fortune, and the appointment of Hanno to a share in the command, the war was brought to a successful close, 238 B. C. Hamilcar now projected the formation of a new empire in Spain, to be a source of strength to Carthage, and the point whence hostilities might be renewed against Rome. This policy was ably prosecuted after his death by Hasdrubal and Hannibal. Hamilcar penetrated into the heart of the country, reduced some cities and tribes and acquired vast wealth. He passed nine years in Spain, and fell in a battle against the Vettones.

HAMILTON, Alexander, American statesman and soldier: b. Charles Town, in the island of Nevis, W. I., 11 Jan. 1757; d. New York, 12 July 1804. His mother, Rachel Faucette (Fawcett) of Huguenot descent, the daughter of a French physician, unhappily married to John Michel Levine, a Danish land proprietor of Saint Croix, left him to live with James Hamilton, a Scotch merchant at Saint Christopher, and by the latter had two sons, Alexander and James. On the father's side they were grandsons of Elizabeth, daughter of Sir R. Pollock, and of Alexander Hamilton of Grange Lanarkshire, Scotland. In 1759 Levine secured a divorce, but his wife was forbidden to remarry. Hamilton's father was unfortunate in his business ventures, and having become a bankrupt it was necessary for

ALEXANDER HAMILTON

Alexander, at the age of 12 years, to earn his own living. He secured a position as clerk in the counting-house of Nicholas Cruger of Saint Croix. His «genius for affairs» was soon apparent, and after two years we find him entrusted with the full management of the business. But ambition for something more than a commercial career had already taken hold of the young man's mind, and he began to write for the local press. A very strong and vivid description of a West Indian hurricane, which had devastated the islands, attracted general attention and aroused the lad's friends to provide the necessary funds to enable him to come to America to complete his education. He arrived at Boston in 1772, and was put in a school at Elizabethtown, N. J., where he industriously prepared himself for college, and in 1774 he entered King's College (now Columbia University), and made a brilliant record as a student. The friction between England and the American colonies was constantly growing more serious, and after studying the question and being convinced that the colonists were right, Hamilton began the advocacy of their cause in a speech at a public meeting, 6 July 1774. The meeting assembled to discuss the calling of a general congress and was held in the fields (now City Hall Park). He also published two pamphlets, asserting the colonists' position in relation to the Crown and to Parliament, and justifying their appeal to arms. The pamphlets were at first thought to be productions of well-known leaders, and when their authorship became known it gave Hamilton a national reputation. Hamilton now turned his attention to preparation for military service in the Revolution. He secured a commission as captain of the first Continental artillery company and entered the patriot service in March 1776. His natural aptitude for organization and command soon made the company a model of discipline and efficiency. He participated in the battles of Long Island, White Plains, Trenton and Princeton, and won the commendation of his superiors for his skill and courage. On 1 March 1777 Hamilton was appointed lieutenant-colonel and aide-de-camp on the staff of Washington, whose entire confidence he secured, becoming the general's confidential secretary. He took an active part in his chief's battles, assisted in planning campaigns and in devising means for the support of the army, and was entrusted with the important and delicate mission of going to Albany to obtain troops from General Gates (who had previously been ordered to send troops to Washington and had failed to do so) — a duty which Hamilton performed with skill and success. It was while on this mission that he first met Elizabeth Schuyler, the daughter of Gen. Philip Schuyler of New York, whom he afterward married (14 Dec. 1780). Having received a reprimand from Washington for a supposed delay he took offense and resigned from the staff 16 Feb. 1781. He had no intention, however, of resigning from the Continental Army, and becoming the head of an infantry regiment, he took part in the siege of Yorktown, heading a storming party and capturing one of the strongest British redoubts. The war was now practically ended, and there being no further opportunity for success in the army, Hamilton returned to civil life. He was but 24 years old and by his natural abilities and capacity for leadership he had attained a foremost place among the great men of his day.

The activity of Hamilton's mind is seen in the fact that while still in active military service he found time to study the great questions of government and finance. In a letter to James Duane he clearly set forth his views on the Constitution, that: «Congress should have complete sovereignty in all that relates to war, peace, trade, finance, and to the management of foreign affairs.» A letter to Morris on the establishment of a national bank induced him to offer Hamilton the place of receiver-general of continental taxes, which he accepted and originated a new system of national taxation. The receiver's office did not prove congenial, and he was relieved of its duties by his election to the Continental Congress from New York 1 Oct. 1782. Congress proved a disappointment. Such were the deplorable conditions then prevailing, the looseness of the Constitution and the financial chaos of the government, that Hamilton's efforts to carry through reforms utterly failed. He resigned from Congress in 1783 and returned to the practice of law in New York, where his melodious voice, dignified deportment and unanswerable logic of reasoning, soon placed him in the highest rank of his profession.

The condition of the States at this time is graphically depicted by Senator Lodge in his 'Life of Hamilton': «Divided among themselves, with no army, no navy, no cohesion, floundering wilfully and helplessly in a sea of unpaid debts and broken promises, bankrupt in money and reputation alike.» To secure some relief the Annapolis Convention (q.v.) was held 11 Sept. 1786, five States only being represented — New York, New Jersey, Pennsylvania, Delaware and Virginia. Hamilton was one of the delegates from New York. This convention adopted an address, drafted by Hamilton, reciting the intolerable conditions and calling for a convention to meet the following May in Philadelphia to form a Federal Constitution. (See CONSTITUTION, FRAMING OF THE). Upon his return to New York he was elected to the State legislature which convened in January 1787, and began a fight to induce the State to send delegates to the Philadelphia convention. In this he succeeded, and three delegates were appointed, of which Hamilton was one; but the other two were Anti-Federalists, bitterly opposed to Hamilton's idea of a strong general government. When the convention met the vote of his own State was cast against him on every question; the Anti-Federalists withdrew from the convention, leaving New York without a vote. Hamilton, however, presented his views of a plan of government to the convention — an artistocratic republic, with a president and senators chosen for life, and the State governors appointed by the Federal government. After the presentation of this plan, which found no support in the convention, Hamilton withdrew, only returning to engage in the final debates, and at the close he heartily embraced the work of the convention and signed the Constitution as actually adopted. ? The Constitution was still to be ratified by the States. New York was opposed to its adoption. There were numerous internal strifes and jealousies, but with great power and determination

Hamilton combated and won over all opponents in the legislature, and by his essays in the *Federalist,* assisted by Madison and Jay, he successfully fought the great battle for the Constitution, winning a hostile majority to its support. Of these essays George William Curtis declared they «gave birth to American constitutional law, which was thus placed above arbitrary construction and brought into the domain of legal truth.»

Washington was inaugurated President in April 1789. In September 1789 Congress passed an act establishing a Treasury Department, and Washington at once made Hamilton the first Secretary of the Treasury. His creative, constructive and practical mind was now confronted with the problem of giving to his country a workable system of national administration. With a master's hand he organized the Treasury Department; reduced the confused finances to order; provided for a funded system and a sound system of national taxation; induced Congress to assume the State debts; authorized methods for the establishing of a national bank and a mint, the raising and collection of internal revenue, the management of the public lands and the purchase of West Point by the government. In 1791 his Report on Industry and Commerce appeared, wherein he discussed with profound ability and clearness the economic problems of his time, and inaugurated, in a very moderate way, the protective tariff system. His methods to strengthen the national government were vigorously opposed by those antagonistic to centralization, chief among whom was Thomas Jefferson (q.v.), and the controversies that then divided parties have been continued by the rival political parties to the present. Engrossed as he was with the home affairs of the government, Hamilton was nevertheless a deep student of foreign relations and advocated a position of strict neutrality on the part of the American government with regard to the difficulties of nations. He ably sustained Washington in his proclamation of strict neutrality between France and England, both in the Cabinet and in the public press, and when M. Genêt, the Ambassador of the French Republic, tried to involve this country in a war with England, Hamilton was vigorous in his condemnation. It was at this time that Jefferson, then Secretary of State, took sides with Editor Freneau of the Philadelphia *National Gazette,* in his criticism of the administration and especially of the Treasury Department. Hamilton replied and the controversy became typical of the two great political parties — the Federalists and the Republicans. Jefferson's position in the Cabinet was most uncomfortable and he resigned 1 Jan. 1794. In 1794 the Whisky Insurrection (q.v.) occurred in Pennsylvania in opposition to the excise laws passed by Congress. Hamilton advised a vigorous policy and when troops were sent by Washington against the insurgents, Hamilton accompanied them and the «rebellion» quickly faded away.

Desiring to give more attention to his private interests Hamilton resigned from the Cabinet 31 Jan. 1795. He declined the office of Chief Justice of the United States Supreme Court and returned to his law practice in New York city where he was at once acknowledged the leader of the bar. But he still continued to take an active interest in political affairs. In 1794 Chief Justice John Jay (q.v.) was nominated by Washington as envoy extraordinary to negotiate a commercial treaty with Great Britain. With Lord Granville a treaty was drawn up known as Jay's Treaty (q.v.), the terms of which were so hard and unjust that when the treaty was published there was a violent outburst of indignation. Hamilton, however, in a series of essays signed «Camillus,» defended the treaty as the best obtainable and after a severe struggle in Congress it was ratified. Washington thoroughly appreciated the judgment and genius of Hamilton, often consulted him on important matters, and received much help from him in the preparation of his messages and speeches. The «Farewell Address would have been less perfect as a composition,» says Renwick, «had it not passed through the hands of Hamilton.» Hamilton had supported John Adams (q.v.) for the Presidency, but Adams was jealous of the power and influence of Hamilton over members of the Cabinet, and made war upon him, expelling his friends from office and assailing him personally. Hamilton blamed Adams for the loss of the elections in New York State, and denounced him bitterly. Adams was renominated in 1800 for the Presidency, but he was beaten by Jefferson, and the Federalist party never won another election. Owing to a defective clause in the Constitution (see JEFFERSON-BURR IMBROGLIO) the election was thrown into the House of Representatives, Jefferson and Burr having received an equal number of votes. Hamilton exerted his great influence with the Federalists and Jefferson was elected. In 1804 the Federalists nominated Aaron Burr (q.v.) for governor of the State of New York. The contest was a bitter one and again Hamilton was instrumental in Burr's defeat, and the latter challenged him to a duel on the ground of an alleged insult. Under the idea that the continuance of his personal influence and the peculiar condition in which the affairs of the country were at the time demanded his acceptance of the challenge, he consented to meet Burr, and the duel was fought at Weehawken, N. J., 11 July 1804. Hamilton was wounded and died the following day, universally mourned by his countrymen. Four sons and four daughters were born to Hamilton; his widow survived him for 50 years, dying at the age of 97. Both are buried in Trinity churchyard, New York city.

American history presents no more striking character than Alexander Hamilton. He was not popular, nor did he strive after popularity, but his memory and achievements are imperishable. He lived for the public good. Eloquent and refined, able and brilliant, the embodiment of devotion, integrity and courage, he has left as deep a mark upon our political institutions as any other statesman America has produced. For his writings, etc., consult Ford, W., 'Bibliotheca Hamiltonia' (1886); Lodge, H. C., 'Works of Alexander Hamilton (9 vols., New York 1885–86; 12 vols., ib. 1904); and for his life, Atherton, G., 'The Conqueror' (New York 1902); ib., 'A Few of Hamilton's Letters' (New York 1903); Choate, J. H., 'Abraham Lincoln and Other Addresses' (New York

1910); Culbertson, S. W., ‘Alexander Hamilton’ (New Haven 1911); Fox, F. T., ‘A Study in Alexander Hamilton’ (New York 1911); Hamilton, A. M., ‘The Intimate Life of Alexander Hamilton’ (New York 1910); his son Hamilton, J. C., ‘History of the Republic of the United States as Traced in the Writings of Alexander Hamilton and his Contemporaries’ (7 vols., New York 1857–64; 4th ed., 7 vols., Boston 1879); the same author's unfinished to 1787 ‘Life of Alexander Hamilton’ (2 vols., New York 1836–40); Lodge, H. C., ‘Alexander Hamilton’ in *American Statesmen Series* (Boston 1882); Morse, J. T., ‘Life of Alexander Hamilton’ (2 vols., Boston 1876); Oliver, F. S., ‘An Essay on American Union’ (London 1906); Shea, G., ‘Life and Epoch of Alexander Hamilton’ (New York 1879).

GEORGE EDWIN RINES.

HAMILTON, Allan McLane, physician: b. Brooklyn, N. Y., 6 Oct. 1848. He was graduated M.D. at the College of Physicians and Surgeons (Columbia) in 1870, and gained distinction as a specialist and author on nervous diseases. He testified as government expert in the trial of Guiteau, assassin of President Garfield. In 1900–03 he was professor of mental diseases at Cornell University Medical College. Besides numerous contributions to medical journals, his published works include ‘Clinical Therapeutics’ (1873); ‘Nervous Diseases’ (1878); ‘Medical Jurisprudence’ (1883); ‘A System of Legal Medicine’ (1894); ‘Railway and Other Accidents, etc.’ (1904); ‘Intimate Life of Alexander Hamilton’ (1911); ‘Recollections of an Alienist’ (1916).

HAMILTON, Andrew, American lawyer: b. Scotland, about 1676; d. Philadelphia, 4 Aug. 1741. His early career is unknown. He was for a time called Trent, and it is not certain at what period he took the name of Hamilton. About 1697 he appeared in Accomac County, Va., where he opened a classical school. In 1716 he went to Philadelphia, the next year became attorney-general of Pennsylvania. From 1721 to 1724 he was in the provincial council and in 1727 was elected from Bucks County to the provincial assembly, continuing to hold his seat, with a year's exception, until 1739, and in 1729 was speaker. He is best known for his gratuitous defense of John Peter Zenger, a New York printer, who was charged with libel in publishing in a newspaper owned by him statements regarding the interference by the governor with the process of the law courts. Hamilton's defense was based on the truth of the statements in the alleged libel. He was successful, was granted the freedom of New York, and, having thereby secured a freer discussion of public officers, was termed by Morris the "day-star of the Revolution." He became judge of the Vice-Admiralty Court of Pennsylvania in 1737.

HAMILTON, Anthony, COUNT, English courtier and man of letters: b. probably Roscrea, Tipperary, Ireland, 1646; d. Saint Germain-en-Laye, France, 6 Aug. 1720. He was descended from a younger branch of the family of the dukes of Hamilton in Scotland. His parents were Catholic and Royalists and removed to France after the death of Charles I and young Hamilton became domiciliated there. He, however, made frequent visits to England in the reign of Charles II. His sister was married to Count Grammont. On the ruin of the royal cause he accompanied James to France, where he passed the rest of his life. Hamilton is chiefly known as an author by his ‘Memoirs of Count Grammont,’ a lively and spirited production, exhibiting a free and, in the general outline, a faithful delineation of the voluptuous court of Charles II. It is an admirable chronicle of the frivolous life of the French and English courts of that time. His other works are ‘Poems’ and ‘Fairy Tales;’ which, as well as the ‘Memoirs,’ are in French, and are really masterpieces of grace and sprightliness.

HAMILTON, Edward John, American educator: b. Belfast, Ireland, 29 Nov. 1834. He was graduated at Hanover College, Indiana, in 1853, and at Princeton Theological Seminary in 1858; was professor of mental philosophy at Hanover College in 1868–79; professor of logic and of ethics in Princeton University 1882–83; and of philosophy at Hamilton College, Clinton, N. Y., in 1883–91. From 1895–1900 he was professor of philosophy in the State University of Washington. He is the author of what is known as ‘Perceptionalism’ (a system of metaphysical philosophy), and has published ‘A New Analysis of Fundamental Morals’ (1870); ‘The Human Mind’ (1883); ‘The Modalist’ (1883); ‘The Perceptionalist or Mental Science’ (1899); ‘The Moral Law or the Theory and Practice of Duty’ (1902); also (after three years' residence in Germany) ‘Perzeptionalismus und Modalismus eine Erkenntnisstheorie’ (1911); and ‘Erkennen und Schliessen, eine theoretische Logik’ (1912); ‘Essays on Theological Questions’ (1916).

HAMILTON, Frank Hastings, American surgeon: b. Wilmington, Vt., 10 Sept. 1813; d. New York, 11 Aug. 1886. He was graduated from the medical department of the University of Pennsylvania in 1833; in 1861 went to the war as surgeon of the 31st New York Volunteers, was made brigade surgeon after the battle of Bull Run and surgeon of General Keyes' corps in 1862. A year later he became medical inspector of the United States army. He was one of the founders of Bellevue Hospital Medical College in 1861, and was professor of surgery there till he resigned in 1875. Dr. Hamilton was associated with Drs. Agnew and Bliss in the care of President Garfield. He wrote on the principles and practice of surgery three works, regarded as standard on the subjects treated, ‘Treatise on Fractures and Dislocations’ (1860); ‘Practical Treatise on Military Surgery’ (1861); and ‘The Principles and Practice of Surgery’ (1872).

HAMILTON, Franklin Elmer Ellsworth, American Methodist Episcopal clergyman and educator: b. Pleasant Valley, Ohio, 9 Aug. 1866. After studying at Harvard College, he became professor of Latin and Greek at Chattanooga University, but decided to take up theological studies instead of pursuing the profession of teaching. Accordingly, he studied at the Boston University School of Theology in 1892, and at Berlin and Paris for three years. In 1892 he joined the New England conference, and held several pastorates. From 1905–06 he was engaged in studying missions, for which purpose he toured the world. He attended the general conferences of 1908 and 1912, and was also a member of the Ecumenical Methodist conference of 1911. In 1908 he succeeded Bishop McCabe as chancellor of the American University at Washington. In connection with the Epworth League, he was president of the New England branch in 1902–04, and vice-president of the World League 1908–12. He wrote 'The Cup of Fire'; 'Why the Pilgrim Fathers Came to America'; 'The 250th Anniversary of the Founding of Harvard College'; 'Lodestar and Compass.'

HAMILTON, Gail. See Dodge, Mary Abigail.

HAMILTON, Gavin, Scottish painter: b. Lanark, Scotland, 1730; d. Rome, Italy, 1797. Sent when very young to Rome, he there devoted himself during the remainder of his life to historic painting. One of his greatest works was his 'Homer,' consisting of a series of pictures representing scenes taken from the 'Iliad.' He published in 1773 'Schola Picturæ Italiæ,' composed of a number of fine engravings by Cunego, making part of the collection of Piranesi; he there traces the different styles from Leonardo da Vinci to the Carraccis; all the drawings were made by Hamilton, and this admirable collection now forms one of the principal treasures in the first libraries in Europe. He spent the latter part of his life in conducting archæological excavations in various localities near Rome.

HAMILTON, Lord George Francis, English politician: b. Brighton, 1845. He was a Conservative member of Parliament for Middlesex in 1868–85, for Ealing division in 1885–1906; in 1874–78 was Under-Secretary of State for India, and in 1878–80 vice-president of the Council. In 1885–86, and again in 1886–92 he was First Lord of the Admiralty, and from 1895 until his resignation in 1903 was Secretary of State for India. He was chairman of the Royal Commission upon Poor Law and Unemployment, 1905–09.

HAMILTON, Sir Ivan Standish Monteith, British general: b. Corfu, 16 Jan. 1853 of Scottish parents. Educated at Wellington College, he entered the army in 1873 as lieutenant; served in the Afghan War, 1878–80; Boer War, 1881; became captain 1882; served with the Nile expedition in 1884–85 and promoted major; in 1886–87 he accompanied the Burmese expedition and rose to lieutenant-colonel; became colonel in 1891; served with the Chitral relief force in 1895, and commanded a brigade in the Tirah campaign 1897–98. On his return home he acted as commandant at Hythe for about a year when the South African War broke out. Colonel Hamilton was "ordered south," first as chief of staff in Natal, then placed in command of a mounted infantry division as major-general. He was barely 47 years old when Lord Roberts trusted him with the command of that part of the main army which entailed most responsibility and independence. The veteran commander-in-chief recognized two great merits in Hamilton: an eye for lay of country which amounted almost to genius and a capacity for pushing on and imposing his will upon the enemy instead of waiting for them to develop their plans. He was also at all times willing to take responsibility, run risks and stake a budding reputation on the venture, a quality too rarely found among officers. Three months after the close of the war Hamilton was promoted lieutenant-general (1902), and full general in 1907. In the Russo-Japanese War 1904–05 he served as British *attaché* with the Japanese army in Manchuria. His experiences of that campaign are recorded in 'A Staff Officer's Scrap Book' (2 vols., London 1905), a work displaying not only a mastery of military technique, but a high literary style and a keen sense of humor. In 1910 General Hamilton was appointed commander-in-chief in the Mediterranean and inspector-general of Oversea forces, which post he held at the outbreak of the European War in 1914. For nearly 40 years he had served with distinction in every British war; he held a great number of medals and had been wounded frequently. In India he had practically lost the use of his left arm by the premature bursting of a shell; another time a shell splinter hit him in the face; bullets found their billets in him on numerous occasions, and in South Africa he was thrown from his horse and broke his collar bone. After the naval attack on the Dardanelles had proved a failure without the co-operation of land troops, the British expeditionary force to the Gallipoli Peninsula was placed under the command of General Hamilton (1915). The disastrous ending to that campaign was in no wise due to the officer in command, but to the delay and miscalculations of the higher authorities. Besides his British orders, General Hamilton holds Japanese, Spanish, Russian and German decorations, and is a grand officer of the Legion of Honor. See War, European: Dardanelles; Gallipoli Peninsula.

HAMILTON, James, English educator: b. near London, 1769; d. Dublin, 31 Oct. 1831. He established language schools in Great Britain, France, United States and Canada. Having done considerable business in Germany and France, he became impressed with the inadequate language textbooks of that time. He came to America in 1815, establishing schools in Baltimore, Salem Mass., and New York city. Later he established one in Montreal. Returning to London in 1823, he met with phenomenal success there. In Manchester he published 'Principles, Practices and Results of the Hamiltonian System' (1829). Later he established a printing and publishing house in Edinburgh. His method consisted in giving the pupils literal printed interlineal translations, following the idiom of the originals, and there was no attempt to teach the grammar until after the phraseology was largely mastered. He created a sensation in London in 1823 by having his daughter Sophia G. Hamilton, aged four, give a lesson in Greek on a public stage. He issued textbooks in a dozen languages and himself largely mastered 17. In Baltimore his system was attacked by the local college, from which he had drawn away pupils, and he defended his method so vigorously that the college students left in a body and came to his Hamilton Institute.

HAMILTON, James, American statesman: b. Charleston, S. C., 8 May 1786; d. at sea, 15 Nov. 1857. He was educated for the bar, but entered the army and served with credit as a major in the Canadian campaign of 1812. At the end of the war he resumed the practice of law in Charleston. For several successive years Hamilton was chosen mayor, or, as it was then termed, intendant of Charleston. To his vigilance and activity was chiefly due the detection of a formidable conspiracy in 1822 among the negro population, led by Denmark Vesey, a free mulatto from Haiti. In the same year he was elected to the State legislature, and was also chosen a representative in Congress, of which he soon became a prominent and popular member. He became noted for intense and energetic opposition to the protective system, and favored direct taxation, regarding all indirect processes for raising revenue as frauds upon the people, and as disparaging to the popular intellect, as well as popular morals. He quitted Congress to become governor of South Carolina in 1830, at a period when the State had resolved upon nullifying the tariff laws of the Federal government. On the settlement of this question by Clay's compromise, Hamilton retired from public life for a time. Later he became interested in the cause of Texas, to which he devoted his personal services, and a large portion of his private fortune. In 1841, while Texas was an independent republic, he was her Minister to England and France, where he procured the recognition of her independence. On the death of Calhoun in 1852, he was appointed his successor in the United States Senate, but declined the office.

HAMILTON, John Church, American biographer and historian, son of Alexander Hamilton (q.v.): b. Philadelphia 1792; d. 1882. Besides editing his father's works (1851), he wrote 'Memoirs and Life of Alexander Hamilton' (1834–40); 'History of the Republic' (4th ed., 1879); 'The Prairie Province' (1876); 'Sketches of Travel.'

HAMILTON, John Taylor, American Moravian clergyman: b. Antigua, W. I., 30 April 1859. He was graduated from the Moravian College, Bethlehem, Pa., in 1875, and from the Moravian Theological Seminary there in 1877. He was pastor of the Second Moravian Church, Philadelphia, 1881–86, and resident professor at the Moravian College and Theological Seminary from 1886 to 1903, in 1901 receiving the degree of doctor of divinity from Lafayette College, Easton, Pa. In 1903 he was elected American member of the Mission Board of the Moravian Church and a bishop of the Moravian Church in 1905. Since 1903 he has served as a member of the Mission Board and since 1914 as president of the general executive board of the Moravian Church, in Herrnhut, Saxony. He has published 'History of the Moravian Church in the United States' (1895); 'A History of the Moravian Church during the 18th and 19th Centuries' (1900); 'A History of Moravian Missions' (1900); 'Twenty Years of Pioneer Missions in Nyasaland' (1912).

HAMILTON, John William, American Methodist Episcopal clergyman: b. Weston, Va., 18 March 1845. He was graduated at Mount Union College, Ohio, in 1865, and from the Boston School of Theology in 1871. He held pastorates in Somerville, Mass., and Boston 1870–92. From 1892 to 1900 he was editor of the *Christian Educator* and secretary of the Freedman's Aid and Southern Education Society. He was a member of the general conferences of 1884, 1888, 1892, 1896 and 1900. He was elected bishop in 1900 In 1898 he was fraternal delegate to the Wesleyan conferences of English and Ireland, and in 1912 was American preacher at the dedication of the Wesleyan central building, London, England. He has published 'Memorial of Jesse Lee and the Old Elm' (1875); 'Lives of the Methodist Bishops' (1883); 'People's Church Pulpit' (1884); 'American Fraternal Greetings' (1899); 'Gordon Battelle — Preacher, Statesman, Soldier' (1916).

HAMILTON, Kate Waterman, American novelist: b. Schenectady, N. Y., 12 Nov. 1841. Since 1870 she has lived in Bloomington, Ill. She is the author of 'We Three'; 'Vagabond and Victor' (1879); 'Rachel's Share of the Road' (1882); 'Tangles and Corners' (1882); 'The King's Seal' (1887); 'The Parson's Proxy' (1896); 'The Kinkaid Venture' (1900); 'How Donald Kept Faith' (1900), etc.

HAMILTON, Patrick, Scottish reformer and martyr: b. probably Glasgow about 1504; d. Saint Andrews, 29 Feb. 1528. Adopting during a short residence on the Continent, the principles of the Reformation, when he settled at Saint Andrews in 1523 he naturally cherished his new convictions, and in 1526 announced them with a decision that attracted the notice of Archbishop Beaton, who proceeded to have him formally summoned and put on trial. Hamilton had meanwhile fled to Germany, where an intimacy formed with Luther and Melanchthon deepened his convictions, and after an absence of six months he returned to Scotland. He openly preached in the neighborhood of Linlithgow, and Beaton under pretense of a friendly conference contrived to allure him to Saint Andrews in January 1528. The early stages of the conference were marked by a conciliatory spirit, but he was led into damaging avowals of opinion, and the result of his trial, on the last day of February, was that he was convicted of divers heresies and delivered over for punishment to the secular power, by which he was condemned the same day. In the afternoon he was hurried to the stake in front of the gate of Saint Salvador's College, his martyrdom, in the 24th year of his age, having done more to extend the principles of the Reformation in Scotland than his life could have done. Consult 'Life' by Lorimer (1857).

HAMILTON, Schuyler, American soldier: b. New York, 25 July 1822; d. there, 18 March 1903. He was a son of J. C. Hamilton (q.v.) and a grandson of Alexander Hamilton (q.v.). He was graduated from West Point in 1841 and served in the Mexican War and in the Civil War also, becoming a major-general of volunteers in 1862. He was subsequently hydrographic engineer to the department of docks. In 1854 he published 'A History of the American Flag,' and in 1877 'Our National Flag, the Stars and Stripes, Its History in a Century,' delivered as an address before the New York Historical Society in June of that year.

HAMILTON, Sir William, Scottish metaphysician: b. Glasgow, 8 March 1788; d. Edinburgh, 6 May 1856. Having studied with distinction at Glasgow, in 1807 he entered Balliol College, Oxford, where he gained first-class honors, and in 1813 he was admitted to the Scottish bar. His taste lay in a different direction, and while he diligently applied himself to almost every branch of literature, mental philosophy became his favorite study. He was appointed professor of civil history in the University of Edinburgh in 1821, and in 1826 became a contributor to the *Edinburgh Review,* enriching it with a series of articles afterward published in collected form, with large additions, as 'Discussions on Philosophy and Literature, Education, and University Reform.' Of these the most celebrated was his 'Critique of Cousin's Cours de Philosophie,' in which was developed that philosopher's doctrine of the unconditioned. Many of these contributions were translated into the leading European languages and attracted much attention from Continental speculators in philosophy. In 1836 he became professor of logic and metaphysics in Edinburgh University. His zeal and ability in discharging its duties were rewarded by the number of ardent students whom he gathered around him. The fame of the Scottish school of metaphysicians, which had begun to wane, was gradually re-established; and his influence would have been felt to even a higher degree had he not been struck with paralysis in 1844, from which he never recovered so far as to undertake the full duties of his position. His mind, however, retained its vigor, and he endeavored to carry out literary designs he had previously formed. In 1846 he published an annotated edition of the works of Thomas Reid, and in 1854 the commencement of a similar edition of the works of Dugald Stewart. His lectures were published in 1859–61, under the editorship of Mansel and Veitch. His views are chiefly expounded in the 'Discussions' and in the 'Dissertations' appended to his edition of Reid, and are attacked in Mill's 'Examination.' Consult Veitch, 'Memoir of Hamilton' (1869); 'Hamilton: the Man and His Philosophy' (1883); Seth, 'Scottish Philosophy' (1890): 'English Philosophies and Schools of Philosophy' (1912).

HAMILTON, Sir William Rowan, Irish mathematician: b. Dublin, 3 Aug. 1805; d. there, 2 Sept. 1865. He knew Greek and Latin when only six, and before he had completed his 14th year had made himself acquainted with 13 languages, among which were Arabic, Persian, Hindustani, Sanskrit and Syriac. When 10 years old he began the study of mathematics, and at 17 presented a paper to Brinkley, the Irish astronomer-royal, which exhibited such a profound knowledge of mathematics that the latter declared the author of it to be already the first mathematician of his age. In 1827, the chair of astronomy in Trinity College, as well as the post of astronomer-royal of Ireland, becoming vacant, Hamilton obtained both appointments, though then only in his 23d year. His life henceforth was exclusively devoted to abstruse studies. He was knighted in 1835; in 1837 was elected president of the Royal Irish Academy, and was an honorary or corresponding member of the principal scientific academies of Europe and America. In 1828 his 'Theory of Systems of Rays' was published. In this his celebrated prediction, on theoretical grounds, of the existence of conical refraction of a ray of light was given to the world. Reasoning on the properties of light, he came to the conclusion that under certain circumstances a ray, instead of being refracted in the ordinary way, should split up into a cone of rays; a phenomenon afterward proved experimentally by Lloyd to take place under proper conditions. In 1834 his 'General Method in Dynamics' was published. In this work and that on 'Systems of Rays' the whole of any dynamical problem is made to depend on a single function and its differential coefficients. Another important treatise of his is 'Algebra looked on as the Science of Pure Time.' He published also 'Memoirs on Discontinuous Functions, or Equations of the Fifth Degree,' etc. But the foundation on which his fame most securely rests is the discovery or invention of the calculus of quaternions, an instrument of extraordinary power in the solution of intricate problems in mathematics and physics. His 'Lectures on Quaternions' appeared in 1853, and in 1866 a posthumous work on the same subject entitled 'Elements of Quaternions.' Consult 'Life of Sir William Rowan Hamilton,' by Graves (1883–89), with an addendum (1892); also biographies by Monck (1881); Shirling (1865); and John Veitch (1869); and Seth, 'Scottish Philosophy' (1890).

HAMILTON, Bermuda, a seaport town, the capital of the Islands on Great Bermuda, Long or Hamilton Island. It has a fine landlocked harbor. Founded in 1790.

HAMILTON, N. Y., a village of Madison County, 29 miles southwest of Utica, on the New York, Ohio and Western Railroad. It is the seat of Colgate University (q.v.). It is in a good agricultural region, contains a lumber yard and canning factory, and has a stone quarry, from which the stone for the construction of most of the university has been taken. Hamilton was first settled in 1792, was separated from the township of Paris in 1795, and named in honor of Alexander Hamilton; the village was incorporated April 1816; in 1895 a fire destroyed the business portion of the town, in which the village records were lost. Later in the same year waterworks and an electric-lighting plant were established, which are owned and operated by the town. In 1903 a free library was opened by the Library Association, and it is intended to make it a public library supported by the village corporation. Pop. 1,689.

HAMILTON, Ohio, city and county-seat of Butler County, on the Great Miami River, the Miami and Erie Canal, the Pennsylvania, Cincinnati, Hamilton and Dayton, Cincinnati, Indianapolis and Western, Erie, Grand Rapids and Indiana railroads, 25 miles north of Cincinnati and 31 miles south of Dayton. The city was founded by Gen. Arthur St. Clair, who established Fort Hamilton in 1791, naming it after Gen. Alexander Hamilton. The fort was again occupied by Gen. Anthony Wayne as a base of his successful expedition which opened up the Northwest Territory in 1793. Hamilton was incorporated as a town in 1810. Its industrial interests are vary large and important. There are 130 manufacturing enterprises, of which several are the largest of their kind in the world. The principal lines of manufacture are machinery, machine tools, paper, safes and bank vaults, engines, sugar mill machinery, paper mill machinery, woolens and felts, coke, pig iron, store and bank fixtures, interior marble, woodenware, cans, stoves, castings, flour, agricultural machinery. The city has a large trade in farm products with the surrounding territory. Hamilton is the first city in the world to own its own waterworks, gas plant and electric plant. The government is vested in a mayor, director of public safety and director of public service and a city council of nine, three of whom are elected at large. Pop. 40,100.

HAMILTON, Ontario, Canada, city and capital of Wentworth County, situated on the shores of Burlington Bay at the western extremity of Lake Ontario, 40 miles from Toronto, 42 miles from Niagara Falls and 70 miles northwest of Buffalo. It was laid out and settled in 1813 by George Hamilton, and is built on a plateau of slightly elevated ground extending around the front of a hilly range from Niagara Falls. Hamilton is connected with a large system of Canadian and American railways,— the Canadian Pacific, Grand Trunk, Toronto, Hamilton and Buffalo, the Michigan Central, the New York Central and the Lehigh Valley and Wabash railways. Hamilton's geographical position at the head of Lake Ontario, with its fine harbor, affords the best shipping facilities to the Northwest Provinces and European markets by water, while her railway facilities are not excelled by any city in the Dominion. She has also become the radius for three electric railway systems. Electric power is obtained from Decew Falls and from Niagara, and natural gas from Welland. Hamilton is one of the chief manufacturing cities in Canada and is in the centre of a fine fruit-growing district. It manufactures agricultural implements, automobiles, air brakes and electrical supplies, belting, boots and shoes, carriages, tobacco, clothing, drugs, elevators, emery wheels, engine packing, fertilizers, furnaces, gasoline engines, harness, glue, mats, paints, pottery, soaps, silverware, nails, vinegar, mattresses, washing machines and musical instruments. Its manufactures considerably more than doubled between 1900 and 1910. It is the seat of a Roman Catholic and Anglican bishoprics, has a provincial normal college, two fine public recreation grounds in Dundurn and Victoria parks, and a race-course. The city returns two members to the Dominion Parliament, and two to the provincial legislature. It is the seat of a United States consulate. Pop. 100,000.

HAMILTON COLLEGE, an institution located at Clinton, Oneida County, N. Y.; founded by Samuel Kirkland, a Congregational missionary, in 1793, as an academy for both white and Indian children. The school was not opened until 1798, although Gen. Frederick William von Steuben laid the cornerstone in 1794. Lack of funds prevented the completion sooner, and to the untiring efforts of its founder was due, in a great measure, the success of the undertaking. It was first called Hamilton Oneida Academy, so named in honor of Alexander Hamilton, one of its original trustees, who was also a benefactor. In 1812 it was chartered by the board of regents of the University of the State of New York as Hamilton College. The school has grown steadily in facilities, keeping well abreast of the times. Two courses are offered: the Latin-Scientific and the Classical. It has fine scientific collections, the Litchfield astronomical observatory and well-equipped laboratories, but has never attempted to give any highly specialized instruction. However, it is one of the most representative of the smaller colleges in the United States and counts many prominent men amongst its alumni. The college has at its disposal 2 fellowships, 90 scholarships, 4 prize scholarships and a number of valuable prizes. The campus, nearly 100 acres, has many notable improvements, gifts from graduates. In 1917–18 there were connected with the school 20 professors and instructors, and 220 students. The library contained over 70,000 volumes. Its productive funds amounted to $1,200,000 and its total income was $86,625. Its presidents include Azel Backus 1812–16; Henry Davis 1817–33; S. E. Dwight 1833–35; Joseph Penney 1835–39; Simeon North 1839–57; S. W. Fisher 1858–66; S. G. Brown 1867–81; Henry Darling 1881–91; M. W. Stryker 1892–1917; F. C. Ferry 1918– .

A history of Hamilton College is given in the consecutive biographies of its presidents in 'National Cyclopædia of American Biography' (Vol. VII, p. 404, New York 1897). Consult Allison, C. E., 'A Historical Sketch of Hamilton College' (Yonkers 1889); Davis, H., 'A Narrative of the Embarrassments and Decline of Hamilton College' (Clinton 1833); Hamilton College, 'A Memorial of the Semi-Centennial Celebration of the Founding of Hamilton College' (Utica 1862); id., 'Annual Catalogue' (Clinton); Powell, E. P., 'New England's First College out of New England' (in *New England Magazine*, N. S. Vol. XX, p. 449, Boston 1899); Root, W., 'Hamilton Oneida Academy in 1794' (in *Magazine of American History*, Vol. XVIII, p. 396, New York 1887); Schuyler, M., 'Architecture of American Colleges' (in *Architectural Record*, Vol. XXX, p. 554, New York 1911); Scollard, C., 'Rose of an Hundred Years; Hamilton College 1812–1912' (Clinton 1912); Sherwood, S., 'The University of the State of New York' (in the United States Education Bureau, *Circular of Information*, No. 3, Washington 1900).

HAMILTON INLET, formerly INVUKTOKE or ESQUIMAUX BAY, Labrador (q.v.), the estuary of the Hamilton or Grand River and the largest of the many fiords or inlets indenting the Labrador Coast. It is located in lat. 54° 30′ N., is about 150 miles long and has an average width of 14 miles and a maximum width of about 25 miles. The surrounding country is high and rocky, possessing, however, extensive forests. The Hamilton, Northwest and Kenamon rivers drain into Hamilton Inlet. Together with other parts of Labrador it has been the cause of frequent boundary disputes between Newfoundland and the province of Quebec. It was apparently first visited in 1500 by Corte-Real, a Portuguese navigator, rediscovered in 1586 by John Davis and then left alone for a long time. In 1777 the English first entered the inlet. Trading posts had previously been established by the French, but were abandoned later. The first English trading post was established in 1785 by a Quebec firm, and in 1837 the Hudson's Bay Company (q.v.) established a trading post, Rigolet, on its north shore which is still being maintained. Its present name was given to it in 1821 by Capt. W. Martin in honor of the governor of Newfoundland of that day, Sir Charles Hamilton. It was first surveyed in 1860 by Sir L.

McClintock of the Imperial Survey; since then it has been visited frequently by explorers and is gradually gaining in development and importance. Consult Gosling, W. G., ‘Labrador: Its Discovery, etc.’ (London 1910); Grenfell, W. T., and others, ‘Labrador, the Country and the People’ (New York 1913); Low, A. P., ‘Report on Explorations in the Labrador Peninsula, etc., 1892–95’ (Ottawa 1896); McLean, T., ‘Notes of a 25 Years’ Service in the Hudson's Bay Territory’ (2 vols., London 1849); Packard, A. S., ‘The Labrador Coast’ (New York 1891); Townsend, C. W., ‘Along the Labrador Coast’ (Boston 1907); Uebe, R., ‘Labrador’ (in *Angewandte Geographie,* Ser. III, Part 9, Halle 1909).

HAMILTON, Mount. See LICK OBSERVATORY.

HAMILTON SERIES, a series of rocks, also known as the Erian, including the Hamilton and Marcellus stages and constituting the Middle Devonian. The name is from the town of Hamilton, 29 miles south of Utica, N. Y., where the series is typically developed. It consists there of shales and sandstones with a few beds of limestones, the most prominent being the topmost member of the series. The Hamilton, like the other Devonian formations, was laid down along the Atlantic shores of what was then the American continent and in a great interior sea, sedimentation being heaviest in a northeast gulf of this sea. The sea extended from eastern New York to western Iowa. In the west the series is largely calcareous. The series is about 1,500 feet thick in eastern New York and reaches a maximum of 2,000 to 5,000 in Monroe County, Pa. It rapidly thins westward. Outside of the interior basin rocks of Hamilton Age have been determined in the Gaspe region of Canada and in the Mackenzie River Valley in Northwest Territory. See DEVONIAN.

HAMILTON STAGE, the upper division of the Hamilton series of rocks, consists chiefly of shaly sandstone and fine shales with a few thin seams of limestone. In Ulster, Albany, and Greene counties, N. Y., the thick-bedded shales are known as North River flagstone, and are quarried on the Hudson River near Kingston, Saugerties and Coxsackie. Some of the thicker layers of these flagstones are known as bluestone.

HAMITES, hăm'īts (descendants of Ham), the name given to several races in North Africa, who are regarded as of kindred origin and speak allied tongues. They include the ancient Egyptians and their modern descendants, the Copts, the Berbers, Tuaregs, Kabyles, the Gallas, Falashas, Somali, Dankali, etc.

HAMLET. No other play of Shakespeare's offers so many complex and interesting problems as ‘Hamlet.’ Critics of the text find in the variations between the first quarto (1603), the second quarto (1604) and the first folio (1623) some baffling questions of textual criticism. The second quarto, “newly printed and enlarged to almost as much againe as it was,” is so different from the first as to suggest a thoroughgoing revision of the entire play. It is evident that the story of Hamlet, first told by Saxo Grammaticus in the 13th century and reproduced in Belleforest's ‘Histoires Tragiques’ as the “Hystorie of Hamblet” in 1570, appealed strongly to the dramatists and the public of the Elizabethan Age. There was an old play on the subject, written by Thomas Kyd or some other contemporary, that was either worked over by Shakespeare or formed the basis of the first quarto. It is probable that the first quarto was surreptitiously taken from the play as acted rather than as written by Shakespeare. It is more certain that Shakespeare, having given the public a typical revenge play, of a somewhat melodramatic type, saw the possibilities of a much greater play, and wrote the Hamlet that we have in the second quarto. In this revised form we still have traces of the Elizabethan Hamlet, who in his revenge and his madness was a very different figure from the character that has fascinated the modern mind. Some scenes that are now considered tragic were then humorous. The transformation of Hamlet from the crude outlines of the Danish story or the early play into his greatest character, and of a typical play of a somewhat sensational type into one of the greatest dramas of the world's literature, is one of Shakespeare's supreme achievements.

Whatever may be said of other characters in the play, or of the play as a dramatic whole, the character of Hamlet himself is undoubtedly the greatest creation of Shakespeare. He has some of the “myriad-mindedness” of his creator. The humor of Falstaff, the melancholy of Macbeth, the penetrating insight into human nature displayed by Iago, the winsomeness of Prince Hal, the intense passion of King Lear — all of these are to be found in Hamlet, and thereto is added an outlook into the infinite, a comprehension of the burden of the mystery of all this unintelligible world that is distinctly his own. He can outjest the grave-diggers, catch the conscience of the king, outwit Rosencrantz and Guildenstern, talk to Osric in his own euphuistic language, open up the heart of a friend to Horatio, and then, left to himself, he can voyage on strange seas of thought alone. There is scarcely a phase of life in which he is not interested: he discusses philosophy with Horatio, and with the players he indulges in reminiscences of the theatre and in a discussion of the laws of dramatic art and the principles of dramatic criticism. The fact is he is a genius with something of the irresistible fullness of life characteristic of the Renaissance.

The interpretation of this character and especially of the nature of the tragedy to which his career leads is one of the baffling problems of criticism. The theory that he was really insane at times is untenable. To all attempts to read his character Hamlet seems to say: “Why, look you now, how unworthy a thing you make of me! You would play upon me; you would seem to know my stops; you would pluck out the heart of my mystery; you would sound me from my lowest note to the top of my compass.” Different types of people find themselves reflected in his words and actions. Coleridge saw in him his own vacillating, over-reflective nature; Goethe exclaimed as he thought of his tendency to subordinate action to thought, “Hamlet is Germany!” So he appears in different rôles as the philosopher, the dreamer, the procrastinator and the cold-hearted misanthrope. A lack of certitude of belief may be the explanation of his inability to lay hold of any plan with calm resolved energy. This emphasis upon his limitations or defects should not prevent the reader from seeing that he is called upon to perform an almost impossible task. The time is out of joint; there is a world of confusion and disorder about him; there is no way for him to act without being suspected as a traitor and an assassin. The truth probably lies between these two theories, his personal characteristics and his external environment reacting upon each other in such a way as to produce fatal consequences. The mystery of his suffering and of that of other characters, notably Ophelia, remains unsolved.

A very interesting study is that of the contrasts to be found in 'Hamlet' — the contrasts between characters and scenes. The characters of Hamlet and Laertes are sharply contrasted: each has lost his father under deplorable circumstances; one is impulsive and rash, the other reflective and calculating. Hamlet and Horatio are devoted to each other and yet so different — one restless, confused and almost dazed, the other evenly balanced, well poised, steady. The contrast between Hamlet's humor and melancholy, each relieving and making more impressive the other, is a dramatic effect. The bringing together in one scene of the grave-diggers and the mourners over the dead body of Ophelia is a violation of the canons of classical dramatic art, but it is true to life.

There is an undercurrent of fatalism in 'Hamlet' that reminds one of a Greek tragedy more than does any other play of Shakespeare. The well-known words, «There is a divinity that shapes our ends, rough hew them how we will,» are the keynote of the play. Hamlet loses control of the plot by killing Polonius, and henceforth Fate has complete charge of affairs. The king has an idea that «a divinity doth hedge a king,» but in the last two acts he gradually brings upon himself the vengeance that Hamlet could not accomplish. Somehow — if not in the way Hamlet had planned — his father's murder is avenged and the queen suffers for her frailty of mind and heart. At the end we are not comforted by intimations of immortality, but are held in the grip of inexorable law. «The rest is silence.»

EDWIN MIMS,
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HAMLET CASE, the designation of the first recorded action in 1850 under the Fugitive Slave Law (q.v.) of that year. It is named after Hamlet, a free negro with a family, who was surrendered after a cursory examination, as a fugitive slave of Mary Brown of Baltimore. He had been arrested by a deputy United States marshal in New York, and the whole circumstances of the case so aroused public opinion that Hamlet was finally redeemed.

HAMLEY, SIR Edward Bruce, English general: b. Bodmin, Cornwall, 27 April 1824; d. London, 12 Aug. 1893. Entering the army in 1843, he served through the Crimean War, was professor of military history at Sandhurst 1859-64, and commandant there 1870-77; and division commander in the Egyptian War of 1882. His 'Operations of War' (1866) is a recognized textbook for military examinations. Among his other publications are 'The Story of the Campaign' (1855), a narrative of the Crimean War; 'Wellington's Career' (1860); 'Voltaire' (1877); 'The War in the Crimea' (1891). He was also the author of a popular novel, 'Lady Lee's Widowhood,' and the admirable sketch entitled 'Shakespeare's Funeral.'

HAMLIN, Alfred Dwight Foster, American architect: b. Constantinople, Turkey, 5 Sept. 1855, a son of Cyrus Hamlin (q.v.). He was graduated from Amherst in 1875, studied architecture in the Massachusetts Institute of Technology in 1876-77 and at the Beaux Arts of Paris in 1878-81. Since 1883 he has been connected with the school of architecture of Columbia University, as special assistant, adjunct professor and (1903-12) executive head; now professor of history and architecture. He has contributed to many periodicals and encyclopedias; author of 'A History of Architecture' (1896); 'European and Japanese Gardens,' in collaboration (1902); and 'Cyrus Hamlin, Missionary' (1903).

HAMLIN, Augustus Choate, American surgeon: b. Columbia, Me., 28 Aug. 1829; d. Bangor, Me., 19 Nov. 1905. He was graduated from Bowdoin in 1851, from the Harvard Medical School in 1855, was appointed assistant surgeon to the 2d Maine Infantry in 1861, and from 1863 until mustered out in 1865, lieutenant-colonel and medical inspector, United States army. Subsequent to the war he practised in Bangor, of which he was twice mayor, and in 1882-86 was surgeon-general of Maine. Among his works are 'Martyria' (1866); 'The Tourmaline' (1873); 'Leisure Hours among the Gems' (1884); and treatises on 'Transfusion' (1868); 'Tetanus' (1868); and 'The Transmission of Disease' (1870).

HAMLIN, Cyrus, American missionary: b. Waterford, Me., 5 Jan. 1811; d. 8 Aug. 1900. He was graduated from Bowdoin College in 1834 and from Bangor Theological Seminary in 1837; and was missionary of the American Board of Missions in Turkey 1837-59. From 1860 to 1876 he was president of Robert College, established after long controversy with the Turkish government. In this position he did much in molding the character of modern Bulgarian leaders and producing autonomy for Bulgaria. Returning to the United States in 1877 he became a professor in the Theological Seminary in Bangor; and was president of Middlebury College, Vermont, 1880-85. Some of his works are in the Armenian language; those in English include 'Among the Turks' (1877); and 'My Life and Times' (1893).

HAMLIN, Hannibal, American statesman: b. Paris Hill, Oxford County, Me., 27 Aug. 1809; d. Bangor, Me., 4 July 1891. Though prepared for college, he did not enter, but became the editor of *The Jeffersonian,* a weekly of Paris, Me.; studied law, was admitted to the bar in 1833, and began practice at Hampden, Me. He was active in Democratic politics, was elected to the lower branch of the State legislature in 1835, served by re-election until 1840, and was speaker in 1837, 1839 and 1840. Nominated for Congress in 1840, he was defeated by the Whig candidate, but in 1842 was elected, and in 1844 re-elected. Chosen for the Senate in 1848 to fill a vacancy, he was again elected in 1851, but in 1856 resigned his seat to accept the governorship of Maine, to which he had been elected as a Republican. In less than a month, however, he re-entered the Senate for a full term. In 1860 he was elected Vice-President on the ticket with Lincoln, and in 1861–65 was president of the Senate. He was thereafter successively collector of the port of Boston (1865–66), United States senator (1869–81), and Minister to Spain (1881–83). Hamlin's separation from his party was due to his strong anti-slavery convictions. During the absence from the House of David Wilmot, he introduced the bill now known as the «Wilmot proviso,» and obtained its passage in the House by 115 to 106. As Vice-President he was a highly-valued counsellor of Lincoln. Consult Hamlin, C. E., 'Life and Times of Hannibal Hamlin' (1899).

HAMLINE, Leonidas Lent, American Methodist bishop: b. Burlington, Conn., 10 May 1797; d. Mount Pleasant, Iowa, 23 March 1865. He was educated for the ministry, but afterward studied law, was admitted to the bar at Lancaster, Ohio, was licensed to preach by the Methodist Church and was a traveling minister in the Ohio Conference. When in 1844 the Methodist Church divided on the slavery question, he was one of the members of the General Conference and drafted the plan for the separation of the Northern and Southern branches. He was a bishop from 1844 to 1852, when he was retired at his own request. His 'Works' were edited by F. G. Hibbard (1869). Hamline University of Minnesota (q.v.) was named in his honor.

HAMLINE UNIVERSITY, a coeducational institution at Hamline, Minn., between Minneapolis and Saint Paul. The school was established under the auspices of the Methodist Episcopal Church, at Redwing, Minn., but it was closed in 1869. In 1880 it was reopened at Hamline. In 1917 there were connected with the school 26 professors and instructors in the college of liberal arts and about 400 students. There were 15,000 volumes in the library and the endowment was $800,000.

HAMMER, a tool for driving nails or wedges and for beating malleable materials. (See MALLET). There are hand hammers, steam hammers and electric hammers. The ordinary hammer of to-day is essentially an American product. Exactly when the hammer came into use is not told in history, but it is certain that some rude form of the instrument must have been used in the earliest days of handicraft. Of the hammers made in America to-day there is no end. There is the little tack hammer which weighs only a few ounces and is indispensable in house, store or factory. Then there is the 20- and 30-ton hammer, driven by steam and used for making immense forgings. The numberless effects which are due to its remarkable force of impact have made the hammer a necessity in all trades. Immense manufactories, employing thousands of men, are grinding year in and year out making hammers, while 10 times as many wholesale houses are busy putting the product on the market. The industry has advanced to such a stage that many general hardware firms in the United States have thrown out the hammer, leaving it to the houses that deal in tools exclusively.

Hammers are made in a variety of shapes, the most in demand being the claw hammer. This and the shoemaker's hammer have retained their shapes for hundreds of years. One gold beating firm relies on them entirely. The sheets or leaves of gold are hammered to such exceeding thinness that 250,000 are required to make up the thickness of an inch. Another odd product of the hammer factory is the butcher's hammer, used for killing cattle. It is capable when properly wielded of carrying a very heavy blow. Then there are the stonecutter's hammer, the carpet-layer's hammer, the wood-carver's mallet and the plumber's odd implement. All of these have a good sale in the markets of the world, because they possess a «something» which users cannot find duplicated in the output of other countries.

HAMMER-HEAD SHARKS, sharks of the genus *Zygæna,* in which the head protrudes on either side into a broad lobe, so that the whole has somewhat the appearance of a double-headed hammer; the eyes on the outer ends of the lobes. Five species are known, two of which (*Z. tiburo* and *Z. malleus*) occur in the warm American seas, and the latter reaches a length of 15 feet or more.

HAMMER-PURGSTALL, Joseph, yō'-zĕf häm'mĕr-poorg'stäl, FREIHERR VON, Austrian Orientalist: b. Gratz, Styria, 9 June 1774; d. Vienna, 24 Nov. 1856. In 1799 he accompanied, as interpreter to Constantinople, the internuncio Freiherr von Herbert, who afterward entrusted him with a mission to Egypt, where he collected various antiquities and manuscripts for the Imperial Library. In 1810 on the occasion of the marriage of Napoleon with Maria Louisa of Austria, he accompanied the latter to Paris, where he became intimate with Sylvestre de Sacy and other Orientalists. In 1817 he was appointed imperial councillor at the court of Austria, where he also held the post of interpreter. In 1835 he received the title of Freiherr. Among his numerous literary works may be mentioned 'Constitution and Administration of the Ottoman Empire' (1815–16); 'Constantinople and the Bosporus' (1821); 'History of the Ottoman Empire' (1835–36); 'History of the Assassins'; 'History of the Golden Horde in the Kiptshak'; 'History of the Ilkhans'; 'History of Persian Eloquence'; 'History of Turkish Poetry' (1836–38); 'History of Arabic Literature' (1850–57); besides numerous translations from Oriental authors and contributions to various periodicals.

HAMMERSMITH, London, a metropolitan and parliamentary borough of London, situated on the left bank of the Thames, six miles west-southwest of Saint Paul's. Area, 2,286 acres. It is a great residential centre, especially favored by artists. Saint Paul's School, founded in 1509, close by Saint Paul's Church and the successor of an older institution dating from the 12th century, was removed here in 1883, and is one of the most important public schools of England. Within the borough is situated the Roman Catholic cemetery of Kensal Green. Kelmscott House, for many years the residence of William Morris, and which gave its name to his well-known publications, is within the borough. The borough returns one member to Parliament. Pop. 121,521.

HAMMOND, James Henry, American politician: b. Newberry, S. C., 15 Nov. 1807; d.

Beach Island, S. C., 13 Nov. 1864. He studied law, was admitted to the bar in 1828 and in 1830 became the editor of a political journal in Columbia, which maintained the doctrine of State rights and advocated nullification in respect to the tariff act of Congress. He entered zealously into the nullification contest which then divided the State, and took an active part in organizing the military force which South Carolina raised in 1833 to resist the Federal government. He was elected to Congress, and took his seat in 1835, but declined a re-election on account of ill-health. In 1841 he was elected general of brigade, and in 1842 governor of South Carolina. While governor he published in 1844 a letter to the Free Church of Glasgow on slavery in the United States, and in 1845 two others in reply to an anti-slavery circular issued by Thomas Clarkson, the English abolitionist. These, in connection with other essays on the same subject, were published in 1853, in a volume entitled ‹The Pro-Slavery Argument.› In November 1857 he was elected to the United States Senate, remaining there till 1860.

HAMMOND, John Hays, American mining engineer: b. San Francisco, 31 March 1855. He was graduated from the Sheffield Scientific School of Yale in 1876, studied at the Royal School of Mines, Freiburg, Saxony, and became an expert on the United States Geological Survey and mineral census, with the duty of examining gold mines in California. In 1882 he was appointed superintendent of silver mines in Sonora, Mexico, but later was again in California as consulting engineer at mines in Grass Valley, and as consulting engineer to the Union Iron Works at San Francisco, and to the Southern and Central Pacific Railwav companies. In the capacity of consulting engineer he visited many portions of North and South America and Mexico. In 1893 he went to South Africa as consulting engineer to the mining companies operated there by Barnato Brothers of London. He was associated with Cecil Rhodes in the latter's numerous mining interests and consulting engineer to the Randsfontein Estates Gold Mining Company, the British South African Company (chartered) and the Consolidated Gold Fields Company. He was one of the four leaders in the reform movement in the Transvaal and for his connection with the well-known Jameson raid, with which, however, he did not sympathize, was sentenced to death by the Boers. This sentence was later commuted to 15 years' imprisonment and then to the payment of a fine of $125,000. He resides in New York, with offices there and in London, and is general manager and consulting engineer of the Guggenheim Exploration Companv. one of the largest mining companies in the world. His reputation as a mining expert is world wide. He declined a nomination for the Vice-Presidency in 1908. He was president of the American Institute of Mining Engineers in 1907–08, served as special Ambassador from the United States at the coronation of George V of England in 1911.

HAMMOND, Samuel, American soldier: b. Richmond County, Va., 21 Sept. 1757; d. Horse Creek, near Augusta, Ga., 11 Sept. 1842. His impulses led him, while a mere boy, to volunteer in the wars of the Virginia frontier with the Indians, where he is said to have greatly distinguished himself; and to have acquired that skill in stratagem which marked his subsequent military performances. In 1775 he raised a company and took part in the battle of Longbridge; and in 1779 he was at the battle of Stono Ferry, S. C. After the fall of Charleston he kept the field with a small cavalry force, pursuing the active partisan warfare which alone maintained the Revolutionary cause in South Carolina. He subsequently settled in Georgia; in 1802 was elected to Congress from Georgia; in 1805 was appointed by Jefferson to the civil and military command of upper Louisiana; and in 1824 removed to South Carolina, where he became surveyor-general of the State in 1827 and secretary of state in 1831.

HAMMOND, William Alexander, American surgeon: b. Annapolis, Md., 28 Aug. 1828; d. Washington, D. C., 5 Jan. 1900. He was graduated from the University of the City of New York in 1848; and entering the United States army in 1849 as assistant surgeon, became surgeon-general in April 1862. After the Civil War he practised his profession in New York for some years and in his later life took to writing fiction. Among his publications are included ‹Military Hygiene› (1863); ‹Sleep and Its Nervous Derangements› (1869); ‹Diseases of the Nervous System› (1871); ‹Neurological Contributions,› etc., and the novels, ‹Robert Severne›; ‹A Strong-Minded Woman›; ‹A Son of Perdition›; ‹Doctor Grattan› (1884); ‹Mr. Oldmixon,› etc.

HAMMOND, Ind., was first organized as a town in 1883 and in 1884 became a city. It is located in the extreme northwest corner of Indiana, bordering over seven miles upon the Indiana-Illinois State line and two miles on Lake Michigan. It is immediately connected with the city of Chicago, and is bounded on the east and northeast with the cities of East Chicago and Whiting, Ind. First a packing-house town, the location of the Hammond Company, numerous other industries have taken its place — such as steel works, railway car and locomotive works, railway appliances, distilling, etc. The F. S. Betz Company, manufacturers of surgical instruments, is the largest of the kind in the world. The W. B. Conkey Printing and Publishing Company is the largest printing and publishing establishment in the United States outside of the government printing office at Washington. The Grand Calumet River passes through the city. This stream is navigable and empties into Lake Michigan at South Chicago, Ill. Both sides of the river are lined with industries of various kinds. The Indiana Harbor Canal connects the river with Lake Michigan, thus affording a harbor on Lake Michigan in Indiana, as well as at the mouth of the river in Illinois. One of the chief distinctions of Hammond is its railroad facilities, having 14 trunk lines and three belt lines. Each of the belt lines connects with every railroad running in and out of Chicago. There are three interurban lines connecting the city with Chicago, Whiting, East Chicago, Indiana Harbor, Gary and other cities in northern Indiana. The city is rapidly developing its banking and financial interests. It is the location of the Lake Superior Court, which is one of general jurisdiction. Hammond has five beautiful parks and an admirably equipped public library, excellent public schools, in addition to Catholic and

Protestant establishments, and is well supplied with churches. It is governed by a mayor and council. Pop. 25,000.

HAMMONDSPORT, N. Y., town in Steuben County, on the Erie and the New York, Ohio and Western railroads, about 55 miles southeast of Rochester and 50 miles southwest of Auburn. The town is in a fertile agricultural section, noted especially for the large number of vineyards. The chief manufactures are wine, fruit-boxes, flour, cigars, barrels, wire hoods and baskets. Hammondsport has a large trade in wine and in grapes and other fruits. It contains a high school and several other good public buildings. Pop. 1,254.

HAMMONTON, N. J., town in Atlantic County; on the Philadelphia and Reading and the Camden and A. railroads; about 27 miles southeast of Camden and 28 miles northwest of Atlantic City. It is situated in a region noted for its rich farms and abundance of fruit. The chief manufactures are shoes and cigars; but it is the trade centre for the northeastern part of the county, and from Hammonton a large amount of small fruits are shipped to New York and other cities. The sewerage system and waterworks are municipally owned. Pop. 5,088.

HAMMURABI, hăm-moo-rä'bē, **The Code of,** instituted by Hammurabi, king of Babylon, about 2200 B.C. is a thousand years older than the Mosaic Age; older than the laws of either Manu, or Moses. It is engraved on a pillar of black diorite, eight feet high, which was finally unearthed, January 1902, in the acropolis mound at Susa. The obverse of the column is surmounted by a bas-relief which represents the god Bel, the lawgiver, before whom the king stands to receive the law. The inscription which covers this stately monolith is the longest Babylonian record ever discovered. It contained originally about 3,000 lines of writing, divided into 49 columns; but five columns on the front have been erased by some Elamite king, probably Sutruk Naknunti, who served the stele of Naram-Sin in a similar manner. The writing is a very beautiful type of the best archaic script, a kind of black-letter cuneiform, long used by kings for royal inscriptions. The code is divided into about 280 clauses and opens with the words, «Law and justice I established in the land, I made happy the human race in those days.»

Character of the Code.— The code shows a most careful and systematic order, beginning with witchcraft, which connects it with a religious code; it passes through all grades of social and domestic life, ending with a scale of official wages for all classes of workmen, even the lowest in the scale. Hammurabi's laws of witchcraft preserve the «ordeal of water.»

«If a man has placed an enchantment upon a man, and has not justified himself, he upon whom the enchantment is placed to the Holy River (Euphrates) shall go; into the Holy River he shall plunge. If the Holy River holds (drowns) him he who enchanted him shall take his house. If on the contrary, the man is safe and thus is innocent, the wizard loses his life and his house.»

The same ordeal was applied to a wife for unfaithfulness or extravagance, or to a wine-seller who sold drink too cheap.

The three essential features of the code may be clearly defined. First it is based on personal responsibility and the *jus talionis.* Thus: «If any one destroys another's eye, his own eye shall be destroyed. If any one breaks another's bone, his own bone shall be broken. If any one knocks out the tooth of his equal, his own tooth shall be knocked out.» Next the belief in the sanctity of the oath before God, as in the Hebrew code, and also the absolute necessity of written evidence in all legal matters, as became a nation of scribes. Judgments in the law courts required a «sealed» document; an agent must take and give receipts for all money or goods entrusted to him; bonded goods required a deposit note. One of the most interesting series of clauses relates to officers or constables employed on active service; the estate of such a person could be entrusted to management, could not be sold or mortgaged, but must be cared for by a deputy, or three years' absence and neglect entailed forfeiture. Substituted service was not allowed. As might be expected in a land so rich in cultivation, the agricultural laws are most explicit. Land must be cultivated, and if neglected the owner had to pay the same as neighboring land. Damage to crop by storm excused the payment of interest on loan. There are very stringent laws as to the tending of the irrigation canals and ditches, and any damage to adjacent land by neglect had to be made good. The commercial laws are extremely important, as showing a highly developed system. Noticeable are the clauses relating to agents or peddlers, commercial travelers of the period.

«If on the road on his business, the enemy have caused him to lose the property he bore, the agent by the name of God shall swear and he shall be quit. If a merchant gives goods to an agent to trade with, the agent shall write down the money he shall take, and the merchant he shall render the agent a sealed (receipt) for the money he gave to the merchant.»

Monetary Transactions.— Money for which no receipt was taken not to be included in the accounts. In case of dispute all witnesses and documents must be produced. Among the commercial laws are some of much interest at the present time relating to licensed premises. It is curious to note that all wine merchants were females.

«If riotous persons assemble in the house of a wine merchant and those riotous persons she seizes not and drives to the palace that wine merchant shall be put to death.»

Curious, too, is the following, which seems to reflect the Hebrew Nazarite law: «No votary or women residing in the cloister may open a wine shop or enter one for drink on pain of being burned.»

In the code's domestic legislation, the most striking feature is the high position and legal protection extended to women. If a man causes a votary or the wife of a man «to have the finger (of scorn) pointed at her and has not justified himself» he is to be branded on the forehead.

To justify herself from scandal a woman could claim the ordeal of plunging in the sacred river. The mere formula of marriage «taking to wife» was not sufficient, for «if a man married a woman and executed not her deeds that woman is no wife.» Divorce law is most fully given — a childless woman could be divorced.

If divorced without cause the husband must allow alimony and custody of her children, and a portion of the estate equal to a son, and the woman was free to marry. The woman could get a divorce, but must justify her right to do so. Thus we read:

«If the wife of a man who dwells in the house of that man has set her face to go forth, and has acted the fool, and wasted his house, and impoverished his house, they shall call her to account. If the husband shall say, I put her away, he shall put her away. She shall go her way; for her divorce he shall give her nothing.»

If the husband insisted, such a wife could be drowned. There is, however, a kindlier tone in the law as to a sick wife. «If a man has married a wife and sickness has seized her, he may take a second wife, but the sick wife he shall not put away; in the home she shall dwell; as long as she lives he shall sustain her.»

Laws of Property.— The laws of property are most full and based on a most equitable system, one clause relates to the remarriage of a widow with young children and might be present-day law:

«If a widow whose children are young has set her face to enter into the house of another, without the consent of the judge she shall not enter. When she enters into the house of another, the judge shall inquire regarding the house of her former husband to that woman and her future husband he shall entrust and cause them to deposit a deed. They shall keep the house and rear the little ones, but furniture for money they shall not sell. A purchaser that has bought any furniture from the children of the widow shall forfeit his money and return the property to its owner.»

Here we have all the essential features of the modern ward in chancery. In the conclusion of this code Hammurabi repeatedly calls himself «King of Righteousness,» as did his contemporary Melchisedek of Jerusalem, and enjoins upon all of his successors upon the throne to observe this code and its laws. Consult Cook, S. A., ‘The Laws of Moses and the Code of Hammurabi’ (London 1903); Davies, ‘The Codes of Hammurabi and Moses’ (Cincinnati 1905); Harper, R. F., ‘The Code of Hammurabi’ (Chicago 1904); Johns, ‘Babylonian and Assyrian Laws, Contracts and Letters’ (Edinburgh 1904); Lyon, ‘The Structure of the Hammurabi Code’ in *Journal of the American Oriental Society* (Vol. XXV, Boston 1904); Rogers, ‘Cuneiform Parallels to the Old Testament’ (New York 1912).

HAMON, Jean Louis, zhŏṅ loo-ē â-môṅ, French genre artist: b. Plouha, Cotes-du-Nord, France, 5 May 1821; d. Saint Raphael, Var, France, 29 May 1874. His work though not strong exhibits grace in drawing and is full of tenderness and charm. His most important work in the United States is ‘Among the Flowers,’ to be seen in the New York Metropolitan Museum.

HAMPDEN, John, English statesman: b. London 1594; d. Thame, Oxfordshire, 24 June 1643. He was educated at Oxford and, possessing an ample estate, led for several years the usual career of country gentlemen. He was cousin-german, by the mother's side, to Oliver Cromwell. He entered Parliament in the beginning of Charles I's reign as member for Grampound, and continued to sit in the House of Commons three times in succession as member for Wendover, and finally for Bucks. He was interested (1632) in the founding of Connecticut. In 1636 his resistance to Charles' demand for ship-money made him the argument of all tongues, especially as it was after the decision of the judges in favor of the king's right to levy ship-money, that Hampden refused to pay it. Being prosecuted in the Court of Exchequer, he himself, aided by counsel, argued the case against the Crown lawyers for 12 days before the 12 judges, and although it was decided against him by seven of them to five, the victory, as far as regarded public opinion, was his. From this time he received the title of the «patriot Hampden.» Henceforward he took a prominent part in the great contest between the Crown and the Parliament, and was one of the five members whom the king, in 1642, attempted, in person, to seize in the House of Commons. When civil war broke out Hampden acted with his usual decision, took command of a regiment in the Parliamentary army, under the Earl of Essex. Prince Rupert having appeared near Thame, in Oxfordshire, Hampden joined a few cavalry that were rallied in haste, and in the skirmish that followed on Chalgrove Field received a wound which proved fatal six days after its infliction. His death was a great subject of rejoicing to the royal party, and of grief to his own. His character and conduct, from first to last, evince his conscientiousness, and he took his rank by acclamation on the one side, and tacitly on the other, high in the list of English patriots. Consult Clarendon's ‘History of the Great Rebellion’; Nugent, ‘Memorials of John Hampden’ (1831), with Macaulay's essay on the same; Forster, ‘Life of Hampden’ (1837); Gardiner, ‘History of the Great Civil War’ (Vol. I, 1880).

HAMPDEN, Renn Dickson, English Anglican bishop: b. Barbadoes, W. I., 29 March 1793; d. London, England, 23 April 1868. Although a man of moderate abilities both as philosopher and theologian, it was his fortune to precipitate one of the most notable controversies in the English Church. As Bampton lecturer for 1832 he lectured on ‘The Scholastic Philosophy Considered in its Relation to Christian Theology,’ which brought upon him the charge of Arianism, and when he became regius professor of divinity at Oxford, in 1836, opposition to the appointment was very bitter and widespread. He was accused of heresy, and the leading men in the Anglican Church took sides in a war of books and pamphlets. In 1847 he was nominated by Lord John Russell for the see of Hereford and the strife of 10 years previous was renewed in organized fashion, many bishops uniting in remonstrance and the dean of Hereford openly resisting. He was nevertheless consecrated in March 1848, and his episcopate of 20 years was quiet, uneventful and useful, the echoes of the great controversy having ceased long before his death.

HAMPDEN, Maine, town in Penobscot County, on the Penobscot River, about five miles southwest of Bangor. The chief manufactures are flour and lumber. There is an extensive river trade, chiefly in lumber and food products. The town is one of the oldest in the State, and recently it has grown steadily in industries and population. Pop. 2,380.

HAMPDEN-SIDNEY COLLEGE, at Hampden-Sidney, in Prince Edward County, Va. The school was founded by the presbytery of Hanover, in 1776, and in 1783 was incorporated by the legislature of Virginia. The land was donated by Peter Johnston, but the acreage has been increased by gifts and purchases, and the college now owns 250 acres. Among the incorporators were Patrick Henry, James Madison, Nathaniel Venable, Paul Carrington, William Cabell, Sr., and many other famous Virginians. Rev. John Blair Smith, the first president of Union College, New York, had previously been president of Hampden-Sidney College, also Rev. Archibald Alexander, the founder of Princeton Theological Seminary. It grants the degrees of bachelor of arts, bachelor of science, bachelor of literature and master of arts. In 1916 there were 118 students in attendance. The library contains 25,000 volumes. The college has an unusual number of alumni who are serving with marked distinction in political, religious and educational fields, and in educational work.

HAMPSTEAD, hămp-stĕd, England, a metropolitan and parliamentary borough of London, four miles northwest of Saint Paul's. Area, 2,265 acres. It is a favorite residential quarter, having associations in this regard with the elder Pitt, Constable and Romney (the artists), Bishop Butler, Sir Richard Steele and Keats. Hampstead Heath, the most popular of London's open spaces, has been left in its natural condition, and is noted for its beauty and attractiveness. Over 100,000 persons have been known to visit it on the Autumn Bank holiday. The borough returns one member to Parliament. Pop. 85,495. Consult Baine, ‘Records of Hampstead’ (1890); Howitt, ‘Northern Heights’ (1869); Park, ‘Hampstead’ (1814); White, ‘Sweet Hampstead’ (1901–04).

HAMPTON, Wade, American general: b. South Carolina, 1754; d. Columbia, S. C., 4 Feb. 1835. During the Revolutionary War he served under Sumter and Marion. He was a Democratic representative in Congress from South Carolina 1795–97, and again from 1803 to 1805. In 1809 he was promoted to be brigadier-general, subsequently was stationed in command at New Orleans, was superseded; in 1813 he was raised to the rank of major-general and appointed to command the force stationed at Norfolk, whence he was shortly afterward ordered to the northern frontier and placed in command of the army on Lake Champlain, with directions to threaten Montreal. The attack on Montreal, for which 12,000 men had been concentrated near Lake Champlain, was frustrated by Hampton's unwillingness to co-operate with his colleague, General Wilkinson, with whom he had been long at enmity. Hampton resigned his commission 6 April 1814, and passed the rest of his life in agricultural pursuits. He was considered the wealthiest planter in the United States, and was reputed to be the owner of 3,000 slaves.

HAMPTON, Wade, American soldier: b. Columbia, S. C., 28 March 1818; d. there, 11 April 1902. He was graduated from the University of South Carolina, studied law but never practised, managed extensive plantations in South Carolina and Mississippi, served in both houses of the State legislature, but, as a Union Democrat, was not popular among South Carolinians. At the beginning of the Civil War, he formed and equipped at his own expense the command of cavalry, infantry and artillery known as "Hampton's legion." With this he won distinction at the first Bull Run and at Seven Pines, where half his troops were killed and himself severely wounded. Having been made brigadier-general of cavalry and assigned to J. E. B. Stuart's command, he took part in Lee's advance northward (1863), was prominent at Gettysburg, and later brilliantly opposed Sheridan's progress in the Shenandoah Valley. He attained the rank of lieutenant-general in 1864, and was placed in command of Lee's entire cavalry forces. In 1865 he commanded J. E. Johnston's cavalry and endeavored to prevent Sherman's northward advance from Savannah. After the war he was an active reconstructionist; in 1876 was nominated as the Democratic candidate for governor, and, after a contest regarding the election with D. H. Chamberlain, the Republican nominee, served until 1878, when he entered the United States Senate. He was in the Senate until 1891, and in 1893–97 was United States commissioner of railroads. Consult Wells, ‘Hampton and Reconstruction’ (1907).

HAMPTON, Iowa, city, county-seat of Franklin County; on the Chicago, Great Western and the Iowa Central railroads, about 29 miles by rail south of Mason City and 60 miles north by west of Marshalltown. It is situated in an agricultural and stock-raising region. The chief industrial establishments are cigar factories and aluminum works; and its principal trade, in addition to the manufactured articles, is in grain, tobacco, live stock and horses. The waterworks are municipally owned. Pop. 3,025.

HAMPTON (formerly HAMPTON COURT-HOUSE), S. C., village, county-seat of Hampton County; on a branch of the Atlantic Coast Line and the Hampton and Branchville railroads, about 67 miles southeast of Augusta. The village is in the yellow pine section, but cotton, sweet potatoes and Indian corn are the staple products of the surrounding farm lands. Its chief manufactured article is lumber. Pop. 748.

HAMPTON, Va., town, county-seat of Elizabeth City County; on the north shore of Hampton Roads; on the Chesapeake and Ohio Railroad, about two and a half miles from Fortress Monroe and 15 miles north by west from Norfolk. In the last of the 16th and first of the 17th centuries the Indian village Kiquotan occupied the site of the present town of Hampton. John Smith and Lord Delaware mention (1608–10) the peaceful friendly Indians of Kiquotan, the hunters and fishermen; but before 1610 there were whites living along the shore and in this Indian village, which retained its Indian name for some time after it became a white settlement. In the first session of the Virginia house of burgesses or colonial legislature (1619), the borough of Hampton was represented. In the War of 1812 the town was attacked by the British and a large part was burned. In 1861 it was again burned by the Confederates. The church of Saint John, Protestant Episcopal, built 1660, is still in good repair. Hampton contains a National Soldiers' Home; a National Cemetery which contains 3,323 graves of soldiers, 600 of them of unknown dead. It is the seat of Hampton Normal and Agricultural Institute (q.v.). It has some manufactures; brick, fish-oil and canned crabs. It has considerable trade in fish, especially oysters, and in fruits and vegetables. It has excellent steamship and bathing facilities and is a popular resort. Pop. 5,505.

HAMPTON COURT, England, a royal palace situated near Hampton, a village of Middlesex, 15 miles southwest of London. The palace is about one mile from the village. The original edifice consisted of five quadrangles, of which two remain; it was built by Cardinal Wolsey in 1525, and presented in 1526 to Henry VIII by whom it was subsequently enlarged, and who formed around it a royal park or chase, which he enclosed and stocked with deer. A third quadrangle was added by Sir C. Wren for William III, who laid out the gardens and park in Dutch style. Hampton Court contains many valuable pictures by Holbein, Lely, Kneller, West, etc. The gardens comprise about 44 acres, and contain a famous «maze» and «wilderness.» Hampton Court was inhabited by successive monarchs and their families until the reign of George II. Suites of apartments in Hampton Court palace are now set apart for persons of rank in reduced circumstances. The state apartments, picture gallery, gardens and home park are open to the public. In 1886 the palace suffered considerable damage by fire.

HAMPTON COURT CONFERENCE, a meeting at Hampton Court (q.v.), on the 14th, 15th and 16th of January 1604, which was convened on the petition of the Puritan ministers to King James I for moderation and tolerance on religious questions. By the composition of the conference,— on the episcopal side being the archbishop of Canterbury, eight bishops, five deans and two doctors, and on the Puritan side only four representatives,— the king sufficiently indicated his attitude toward the aims of the Puritans, and the proceedings consisted chiefly of adulation of James on the part of the episcopal party, and lecturing of the Puritan members by King James. A few alterations were made in the Prayer Book, and a new version of the Bible was agreed upon, the result being the authorized version of 1611.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, a school for negroes and Indians, opened in 1868, in Hampton, Va., under the auspices of the American Missionary Association. It was chartered by the State in 1870. The school is owned and controlled by a private corporation, administered by 17 trustees. The charter gives the trustees power to choose their own successors, and to hold property without taxation to the amount of $800,000. In 1875 the general assembly of Virginia passed an act giving the institute one-third of the agricultural college land-grant of Virginia (see COLLEGES, LAND-GRANT) amounting to 100,000 acres, which was sold for $95,000 and which pays regular annual interest. The school was first opened in an old barracks (used during the Civil War), with two teachers and 15 pupils. It now owns 188 acres on Hampton River, upon which have been erected dormitories, a library, classroom buildings, a church, gymnasium, saw and planing-mill, shops, hospital, domestic-science school, trade school — in all numbering 60 buildings. The institute owns also a stock farm of 600 acres, about five miles from the school. The farm land, and the workshops where trades are taught, furnish occupation for the boys and young men. The girls are instructed and employed in sewing and cooking classes, in all the domestic work of the school, and wherever possible learning trades side by side with the boys. In 1896 the Armstrong and Slater Memorial Trade School was opened. (See NEGRO, EDUCATION OF THE). In this school is taught the theory and practice of blacksmithing, carpentry, house painting, tailoring and general repairing. The pupils are taught also mechanical, civil, electrical, and mining engineering. On the farms they are taught how to care for stock, how to raise different crops, and the theory and practice of farming in general. The students are charged $10 a month for board, which is largely paid in labor. They are expected to provide their own books and clothing, and for the tuitions, buildings, furniture and the implements used on the farms and in the shops the school is dependent on the charity of the country. In 1878, 15 Indians, who had been prisoners of war at Saint Augustine, Fla., and in charge of Capt. R. H. Pratt, were admitted as students. Since then the Indian department has increased steadily, the pupils being chiefly from the Sioux tribe, of whom two-thirds make a fair or good record. The young men of the school are organized into six military companies, all forming one battalion. This places the young men under military discipline. The *Southern Workman,* a monthly school periodical, is edited, printed and managed by the pupils with only a general supervision by one of the teachers. The vacation is from June to October for all except the pupils in the industrial departments, which continue work all the year. During the regular long vacation a large number of the colored teachers of the South assemble here for a summer school. For the past 10 years the average attendance at these summer schools has been nearly 500. The students number about 1,800, more than half of whom are teaching in the colored schools of the South. In 1917 the number of pupils in Hampton Institute was about 1,400, about 90 per cent of whom were in the industrial and preparatory departments, the remainder in the college department. The faculty, instructors and officers numbered 133. The library contains about 37,000 volumes. Many of the graduates are engaged in farming or working at trades; some are teaching. Booker T. Washington (q.v.), of the class of 1875, is the most noted graduate. Hampton's endowments amount to about $2,750,000. The annual income is about $290,000, and comes from the government Indian funds, the Slater and Peabody funds, the State land-grant and agricultural funds and from private donations.

HAMPTON ROADS, Va., a broad, deep channel which connects the estuary of the James River with Chesapeake Bay; really a part of the estuary which is at the mouths of the James, Elizabeth and Nansemond rivers. Some of the good harbors along the shore are Norfolk and Portsmouth on the south; Hampton, on the Hampton Creek, an arm of the Hampton Roads, on the north. At the entrance are Forts Monroe and Wool. On the north side of the entrance is Thimble Shoal light. A large number of railroads have terminals on Hampton Roads, especially at Norfolk. This estuary, or channel, is considered of great military importance. During the Civil War its advantages as a military station were demonstrated. On Hampton Roads occurred the battle of Hampton Roads (q.v.), the first engagement between ironclads.

HAMPTON ROADS, Battle of. Hampton Roads was the rendezvous of several important naval and military expeditions during the war, and the scene of two memorable encounters. On 8 March 1862 the Confederate ram *Merrimac* (or *Virginia*) left her anchorage at Norfolk, 12 miles from Fort Montroe, steamed down Elizabeth River and, with her consorts, five in number, attacked the Union fleet of five vessels in the Roads, destroying the *Congress* and *Cumberland*, which lost over 250 men, and then retired to the mouth of Elizabeth River. Next morning the *Merrimac* returned to the Roads to complete the destruction of the Union fleet, but was met by the *Monitor*, which had arrived the night before from New York, and a novel naval battle ensued, resulting in the return of the *Merrimac* to Norfolk and the saving of the remainder of the Union fleet. See Monitor and Merrimac.

HAMPTON ROADS CONFERENCE, an informal conference held 3 Feb. 1865, between President Lincoln and Secretary of State Seward, representing the United States government, and Vice-President Alexander H. Stephens, Senator Robert M. T. Hunter and Assistant Secretary of War John A. Campbell, representing the Confederate States. The meeting took place on board the *River Queen*, near Fort Monroe, and its object was the arrangement of a peace between the North and South. The originator of this conference was Francis P. Blair (q.v.) who thought a combination of North and South against Maximilian in Mexico, in enforcement of the Monroe Doctrine, would bring in peace by a diversion. President Lincoln refused to join the conference excepting with a view to the restoration of union, and on the understanding that the Emancipation Proclamation was to stand without qualification. He disapproved of a joint action against the French in Mexico. The conference lasted for four hours, but broke up without reaching any definite conclusion.

HAMSTRING. See Anatomy; Muscles.

HAMSUN, Knut, Norwegian novelist: b. Loni, 4 Aug. 1860. He spent a number of years in the United States, earning a living in the most difficult and unhealthy occupations, which caused him to return to Christiania in 1888 with very unfavorable impressions of America. His experiences in America were the foundation for a very savage attack on American institutions and manners ‘Fra Amerikas Aandsliv’ (‘American Spiritual Life,’ 1889), as well as for his first powerful novel, ‘Sult’ (‘Hunger,’ 1888). His novels include: ‘Mysterier’ (1892); ‘Redaktör Lynge’ (1893); ‘Ny Jord’ (English translation, ‘Shallow Soil,’ New York 1914); ‘Pan’ (1894); ‘Siesta’ (1897); ‘Victoria’ (1898); ‘Munken Vendt’ (1902). He has also written plays and a book of travel in the Caucasus. A collected edition of his works appeared at Christiania in 1899.

HAN-YANG, hän-yäng′. See Hankow.

HANAFORD, Phebe Ann Coffin, American Universalist minister: b. Nantucket, Mass., 6 May 1829. In 1849 she was married to J. H. Hanaford, a teacher. She was the first woman ordained to the ministry in New England and since her ordination in 1868 has held pastorates in Hingham and Waltham, Mass., New Haven, Conn., and Jersey City. She has been industrious as a writer, among her many published works being ‘Life of Abraham Lincoln’; ‘Life of George Peabody’; ‘Lucretia the Quakeress’; ‘Leonette, or Truth Sought and Found’; ‘The Best of Books and its History’; ‘Frank Nelson, the Runaway Boy’; ‘The Soldier's Daughter’; ‘Field, Gunboat and Hospital’; ‘Women of the Century’; ‘From Shore to Shore and Other Poems,’ etc.

HANCOCK, JOHN, American statesman: b. Braintree, Mass., 23 Jan. 1737; d. Quincy, Mass., 8 Oct. 1793. He was graduated at Harvard College in 1754, but shortly after entered the counting house of an uncle, on whose death in 1764 he received a fortune of £80,000. After 1766 he was several times elected to the Massachusetts General Court. It was the seizure of his sloop, the *Liberty*, that occasioned the riot in 1768, when the royal commissioners of customs narrowly escaped with their lives. After the so-called «Boston massacre,» in 1770, he was a member of the committee to demand of the royal governor the removal of the troops from the city, and at the funeral of the slain delivered an address which greatly offended the governor, who now endeavored to seize the persons of Hancock and Samuel Adams. Both were members of the Provincial Congress at Concord and later of that at Cambridge, and Hancock was president of each. This arrest is said to have been one of the objects of the expedition to Concord which led to the first battle of the Revolution after which Gage offered pardon to all the rebels except these two, «whose offences,» he added, «are of too flagitious a nature to admit of any other consideration but that of condign punishment.» In 1775 Hancock was chosen president of the Continental Congress, and in 1776 signed the Declaration of Independence. He resigned from the presidency in 1777 but was a member of the Congress until 1780 and again in 1785–86. With rank of major-general, he commanded the Massachusetts forces in the Rhode Island expedition, in 1780 was a member of the Massachusetts Constitutional Convention, and under that constitution was in 1780 chosen first governor. To this office, with an interval of two years (1785–87) he was annually re-elected till his death. His last important office was as president of the convention in 1788 on the adoption of the Federal Constitution. Hancock was a man of strong common sense and great decision of character, of polished manners, easy address, affable, liberal and charitable. His personal vanity and his jealousy were at times conspicuous, but he was a sincere patriot and of much ability. John Adams said of him: «He was by no means a contemptible scholar or orator. Compared with Washington, General Lincoln or Knox, he was learned.» Consult Brown, A. E., 'John Hancock: his Book' (1898); Sears, 'John Hancock the Picturesque Patriot' (1912).

HANCOCK, Winfield Scott, American soldier: b. Montgomery Square, Pa., 14 Feb. 1824; d. Governor's Island, New York Harbor, 9 Feb. 1886. He was graduated from the United States Military Academy in 1844, and after frontier service in the Sixth Infantry, fought with credit in the Mexican War, was successively regimental adjutant and quartermaster in 1848-55, and briefly assistant adjutant-general to the Department of the West. Appointed assistant quartermaster with rank of captain in 1855, he was stationed at Fort Myers, Fla., during the Seminole disturbances, and in 1857-58 was in Kansas, whence, after service in the border troubles, he was ordered successively to Utah and California. In 1859-61 he was chief quartermaster of the southern district of California, with headquarters at Los Angeles. At the beginning of the Civil War he was commissioned brigadier-general of volunteers, and assigned to the command of a brigade in Smith's division, Fourth corps, Army of the Potomac. He distinguished himself at Williamsburg and during the second day's fight at Antietam (17 Sept. 1862) was placed in command of the First division, Second army corps. Promoted major-general, United States Volunteers (November 1862), he commanded his division at Fredericksburg in the attack on Marye's Heights, on which occasion he lost 2,013 from a total of 5,006 troops. He largely saved the day at Chancellorsville (2-4 May 1863) and shortly afterward was assigned to the command of the Second corps. In July 1863 he was ordered by Meade to proceed to the field of Gettysburg, take command and report whether battle should be given at that point. He reported Gettysburg as the suitable place for the ensuing battle, reorganized the Federal lines, on 2 July commanded the left wing and on the next day the left centre, against which was directed a Confederate charge in the course of which the Second corps lost about 4,000 killed and wounded out of less than 10,000 troops, and Hancock was shot from his horse. In 1866 he was appointed major-general, United States army, in 1866-68 commanded successively the departments of Missouri and of Texas and Louisiana, in 1868-69 the military division of the Atlantic, in 1869-72 the Department of Dakota. He was again assigned to the division of the Atlantic in 1872. In 1880 he was Democratic candidate for the Presidency, but was defeated, largely on the tariff issue, by Garfield by a vote of 4,454,416 to 4,444,952. He was a brilliant leader, known as «Hancock the Superb» — «the most conspicuous figure,» says Grant, «of all the general officers who did not exercise a separate command.» Consult the 'Life,' by Walker (1894).

HANCOCK, Mich., city in Houghton County; on Lake Portage, and on the Duluth, S. S. & A. Railroad; opposite Houghton (q.v.). Although the northern part of Michigan and this region had been explored by missionaries in the 17th century, the first permanent settlement was made in Hancock in 1859 and the village was incorporated in 1863. Incorporated as a city in 1903. It is situated in a section rich in minerals, the Lake Superior copper belt. The Quincy Mining Company is also located there; the Calumet and the Hecla copper mines are nearby and the city has foundries, machine-shops, smelters, stamp-mills, lumber and brick yards. Hancock has two banks, with a combined capital of $350,000. The Detroit Northern Michigan Building and Loan Association has its main offices in Hancock. An overall factory and a furniture plant are new additions. A ship-canal to Lake Superior brings a large portion of the lake traffic to and from Duluth and Superior through the «short cut,» by way of Hancock. It is the seat of a Finnish college. The government is vested in a mayor, whose term of office is one year, and a city council who are elected by the people. The city owns and operates the waterworks. Pop. 8,981.

HANCOCK, N. Y., village in Delaware County, at the confluence of the two branches of the Delaware River, on the Erie and the New York, Ont. and Western railroads. There are in the vicinity bluestone quarries which add to the industrial wealth of the village; the other industrial establishments being flour mills, tanneries, a wood-alcohol factory and large refinery, a charcoal mill for the preparation of charcoal in all its forms and lumber yards. An excellent high school is located here. The village is a trade centre for an extensive agricultural region; it has good shipping facilities and electric power.

HANCOCK, Mount, a peak of the Big Game Range, in the southern part of the Yellowstone National Park, on the boundary between the Park and Wyoming. It is on the western border of Two Ocean Plateau, a portion of the continental divide. The Snake River (q.v.) has its rise on the east side of Mount Hancock, flows north by west, then south by west around and almost circling the mountain. Mount Hancock is 10,235 feet in height.

HAND, Edward, American revolutionary soldier: b. Clyduff, King's County, Ireland, 31 Dec. 1744; d. Rockford, Lancaster County, Pa., 3 Sept. 1802. In 1774 he came to America as surgeon's mate in the 18th Royal Irish regiment, but he later resigned and entered medical practice in Pennsylvania. At the outbreak of the Revolutionary War he became a lieutenant-colonel in Gen. William Thompson's brigade, participated in the siege of Boston and in 1777 was appointed brigadier-general. In 1778 he succeeded General Stark in the command at Albany and later took part in General Sullivan's expedition against the Iroquois. He sat in Congress in 1784-85 and signed the Pennsylvania constitution in 1790.

HAND. The human hand is composed of 27 bones, namely, eight bones of the carpus or wrist arranged in two rows of four each, the row next the fore-arm containing the scaphoid, the semi-lunar, the cuneiform and the pisiform, and that next the metacarpus, the trapezium, the trapezoid, the os magnum and the unciform. The metacarpus consists of the five bones which form the palm, the first being that of the thumb, the others that of the fingers in succession. Lastly, the fingers proper contain 14 bones called phalanges, of which the thumb has but two, all the other digits having three each. These bones are jointed so as to admit of a variety of movements, the most characteristic being those by which the hand is flexed backward, forward and sideways, and by which the thumb and fingers are moved in different ways.

The chief muscles which determine these movements are the «flexors,» which pass down the forearm, are attached by tendons to the phalanges of the fingers and serve to flex or bend the fingers; and the «extensors» for extending the fingers. There are two muscles which flex all the fingers except the thumb. The thumb has a separate long and short flexor. There is a common extensor for the fingers which passes down the back of the forearm and divides at the wrist into four tendons, one for each finger, each being attached to all three phalanges. The forefinger and little finger have, in addition, each an extensor of its own, and the thumb has both a short and a long extensor. The tendons of the muscles of the hand are interlaced and bound together by bands and aponeurotic fibres, and from this results a more or less complete unity of action. It is sometimes difficult to make a movement with a single finger without the others taking part in it, as in executing instrumental music, for instance; but practice gives to these movements perfect independence.

Of all the movements of the hand the opposition of the thumb to the other fingers, alone or united, especially characterizes the human hand. This action of the thumb results from its length, from the first metacarpal bone not being placed on the same plane as the other four, as is the case in the monkey, and from the action of a muscle — the long flexor of the thumb — peculiar to the human hand. This muscle completes the action of the other motor of the thumb and permits man to hold a pen, a graver or a needle; it gives to his hand the dexterity necessary in the execution of the most delicate work. Properly speaking then, the hand, with its highly specialized muscles, belongs to man alone. It cannot be considered, as in the ape, as a normal organ of locomotion. It is essentially the organ of touch and prehension. It molds itself to a body to ascertain its form; it comes to the aid of the eye in completing or rectifying its impressions. The functions of touch devolve principally on its anterior or palmar face, the nervous papillæ abounding specially at the ends of the fingers. A layer of adipose tissue very close in texture protects, without lessening its power or its delicacy, the network of muscles, vessels and nerves with which this remarkable organ is equipped.

HANDBALL, a popular game of ball, the bare hand only being used. The game is indigenous to Ireland, but has been transplanted to America, where are the most expert players. Two or four men can play, one or two on a side. As far as is known the game of handball came to the United States about 1840, and has since become one of the sports under the regulations of the Amateur Athletic Union. The game consists of scoring the ball against a single back wall, with a lined-out space of 60 feet in front, or in an enclosed court of that length, 25 feet wide, and 30 feet walls. The ball coming from the wall (when played in the open) must fall between these two lines to be in play. The game is simply to strike the ball on the rebound with the hand. Consult Spalding's 'Official Handball Guide.'

HANDEL, George Frederick (properly GEORG FRIEDRICH HAENDEL), English composer: b. Halle, Saxony, 23 Feb. 1685; d. London, 20 April 1759. His father, intending him for the law, discouraged the strong passion which he evinced early in life for music. But although forbidden the use of musical instruments, he contrived to hide a small clavichord in a garret, where he amused himself during the night after the rest of the family had retired, and made such progress that, when at seven he accompanied his father to the court of Saxe-Weissenfels, he played on the church organ with such power and effect that the Duke, who accidentally witnessed his performance, used his influence successfully with the father to permit him to follow his inclination. He was accordingly placed under Zachau, organist of the cathedral, and was soon so far advanced in the practical part of the science as to officiate as deputy to his instructor. At 14 he went to Berlin, where the opera under the direction of Buononcini and Attilio was then in a very flourishing condition. Attilio became his teacher and friend. In 1703 he went to Hamburg, and procured an engagement in the orchestra at the opera there. On 30 Dec. 1704, he brought out his first opera, 'Almira'; in the February following, this was succeeded by his 'Nero' and subsequently by 'Florindo' and 'Daphne.' He then went to Italy, where he composed the operas 'Rodrigo' and 'Agrippina,' and the first form of the serenade 'Acis and Galatea.' On his return to Germany in 1710 he entered the service of the Elector of Hanover, afterward George I of England, as chapelmaster; but having received invitations to visit London, he set out for England, where he arrived at the end of 1710. On the occasion of his first visit to England he composed the opera 'Rinaldo.' He soon returned to Hanover, but at the end of two years again received permission to visit England. At the time of his arrival in London the negotiations for the Peace of Utrecht were just about to be concluded, and Handel was invited by Queen Anne to compose a 'Te Deum' and 'Jubilate' in celebration of the peace. But this act was so distasteful to the Elector of Hanover that Handel did not venture to return, and remained in England on an income of £200 a year allowed him by the queen. He was, in consequence, on the accession of his royal patron to the throne of Great Britain in 1714, in much disgrace, till Baron Kielmannseck restored him to favor. From 1715–18 Handel resided with the Earl of Burlington, and then quitted that nobleman for the service of the Duke of Chandos, who retained him as chapelmaster to the splendid choir established at his seat at Cannons. For the service of this magnificent chapel Handel produced those anthems and organ fugues which alone would have been sufficient to immortalize him. When the Royal Academy of Music was instituted by some of the leading noblemen of England, Handel, whose fame had now reached its height, was placed at its head; and this, for a short period, may be considered as the most splendid era of music in England. The warmth of his own temper, however, excited by the arrogance and caprice of some of his principal Italian singers, caused many violent quarrels; and public opinion becoming enlisted in favor of his opponents, and especially of his rival, the musician Buononcini, his popularity waned somewhat and the academy was dissolved (1728). Handel then started a new operatic company. But a rival company to his was afterward started, and the result was that much money was lost by both. The operas which he had composed up to this date (1735), from the institution of the Academy of Music, were 'Radamisto'; 'Ottone'; 'Giulio Cesare'; 'Floridante'; 'Flavio'; 'Tamerlano'; 'Rodelindo'; 'Alessandro'; 'Scipione'; 'Ricardo I'; 'Tolomeo'; 'Siroe'; 'Lotario'; 'Parthenope'; 'Poro'; 'Orlando'; 'Sosarme'; 'Ariadne'; 'Ezio'; 'Ariodante'; and 'Alcina.' Among other works should be mentioned his first English oratorio, 'Esther,' and his delightful pastoral 'Acis and Galatea.' In 1736 his famous setting of Dryden's ode, 'Alexander's Feast,' was performed with brilliant success. His last opera was performed in 1741. Handel had by this time begun to devote himself chiefly to music of a serious nature, especially the oratorio. The approval which his first works of this kind 'Esther,' 'Deborah' (1723), 'Athalia' (1733), had met with encouraged him to new efforts; and he produced in succession 'Saul,' 'Israel in Egypt,' and 'The Messiah.' The last-mentioned, his chief work, was brought out at Dublin in 1742. This sublime composition had been composed the previous year in the incredibly short period of 23 days. When Handel returned to London his oratorios were received at Covent Garden Theatre with the greatest approbation by overflowing audiences — 'The Messiah' in particular increased yearly in reputation. Before it was given, however, a new oratorio, 'Samson,' was produced (1743), and there next followed 'Joseph and his Brethren' (1744), 'Belshazzar' (1745), 'Judas Maccabæus' (1747), 'Joshua' (1748), 'Solomon' (1749) and 'Jephthah' (1752). Some time before his death he was afflicted by nearly total blindness; but he continued not only to perform in public but even to compose. His own air, however, 'Total Eclipse,' from the oratorio of 'Samson,' is said always to have affected and agitated him extremely after the loss of his sight.

Handel's habits of life were regular; his appetites were coarse, his person large and ungainly, his manners rough and his temper even violent; but his heart was humane, and his disposition liberal. His musical powers can hardly be estimated too highly. In boldness and strength of style, and in the combination of vigor, spirit and invention in his instrumental compositions he has never been surpassed. His choruses have a grandeur and sublimity which have hardly been equaled. Yet a singular fact in regard to him as a musician is that in some of his works he shows himself as an unscrupulous plagiarist — a fact of which various explanations and palliations have been attempted. He was buried in Westminster Abbey, where a monument by Roubillac was erected to his memory. Consult 'Lives' by Chrysander (1858-67); and Rockstro (1883); Whittingham, 'Life and Works of Handel' (1882); Rolland, R., 'Handel'; Streatfield, R. A., 'Handel' (London 1909); the articles in the 'Dictionary of National Biography' and Grove's 'Dictionary of Music.'

HANDICAPPING, a term used in racing: The allowance of time, distance or weight made to the inferior competitors in a race with the object of bringing all as nearly as possible to an equality; the extra weight imposed on a superior horse in order to reduce his chance of winning to an equality with that of an inferior animal. The handicap is framed in accordance with the known previous performances of the competitors, and in horse-racing also with regard to the sex and age of the animals engaged. The principle is the same in other contests, as in billiards a superior player is handicapped by having to allow his inferior competitor a start of a certain number of points.

HANDIES (hăn'dĭz) **PEAK**, in the southeastern part of Colorado, in the San Juan Range; about 12 miles northeast of Silverton. Rich deposits of silver ore are found in all the mountains of this vicinity; the range is known as the «Silver San Juan.» The altitude of Handies Peak is about 14,000 feet.

HANDWRITING, Expert Analysis of. A mental image may be made either consciously and with attention to every detail, or with varying degrees of consciousness amounting in some cases to almost complete automatism, but it must in any case be largely influenced by the machine which produces it. No matter what care may be employed to make two objects alike, a sufficiently minute inspection will always discern differences between them. It is from this fact we are able to distinguish a particular tone of a bell, a particular face, etc. All things, and notably those which owe their existence to organic life, are resultants of very complex forces acting simultaneously or in sequence, and in comparing similar resultants it is ever found that quantitative or qualitative differences of the constituent forces employed in fashioning them have occasioned differences in the objects themselves. These differences may be indiscernible to the casual view, but will never fail to reveal themselves to an examination sufficiently searching.

The factors employed in making marks may be roughly divided into: A, the model in the mind which it is the intention to reproduce; and B, the mechanism by which the act is to be accomplished. Under the latter head there is to consider not only the permanent structure of the individual, which necessarily limits his performance, but also the manner of employing this structure, which becomes a habit, and the fluctuations, due to disease, drugs, variations of mood, increasing age, etc., in the motor impulses controlling it.

The basis of any sound judgment on the authorship of designs such as pictures or handwritings depends upon the recognition of sorts of differences; which it is essential to distinguish from each other. In general, designs by different authors differ in kind, while those of the same author differ in degree. The methods for distinguishing these two sorts of differences will be more particularly treated hereafter.

The general subject of the study of those characteristics which distinguish each handwriting from every other has been called *Grammapheny;* the study of methods for detecting frauds relating to handwriting either in imitating, altering or suppressing a record, is called *Plassopheny;* and the general study of the records of human thought, including their forms, their purport and the tools and materials by means of which they are produced is called *Bibliotics.*

Ever since the more or less permanent records of human thought have had a value they have been the objects of falsification. It is not known to how great an extent this may have been practised in the hieroglyphic and ideographic carvings on stone, but doubtless interpolations were frequent in recording the deeds of their kings, and the sculptors imitated each other's style with a view of bettering their own; or each other's peculiarities to convey false impressions as to the narrator.

But with the introduction of writing in pigments on parchment and papyrus the greater facility with which alterations and erasures could be made immediately attracted the attention of the unscrupulous. According to historians the Greeks, Romans, Egyptians, Assyrians and others practised garbling and forgery by erasing, resurfacing and bleaching manuscripts to change their purport, or give false impressions of their age and authorship. These depredations, then as now, were chiefly made upon manuscripts of persons absent or, more commonly, deceased; whole compositions which they never saw being ascribed to them. As an example may be cited the interpolation in the text of Josephus with which Eusebius has been charged. A host of epistles, papal decrees, productions of the Fathers and dogmatical treatises were in early times altered, erased in part, and falsified from the original text, sometimes by learned and reverend scholars for the greater glory of the Church, and sometimes by obscure copyists from ignorance, or trifling incentives. Erasmus declared he knew of but a single important old manuscript which was not tainted by this kind of fraud. The methods of effacing the writing of a parchment multiplied in proportion to the increase of manuscripts and the cost of parchment. The practice of using such effaced parchments for other writings was common in the time of Cicero, as a letter from him to Trebatius testifies. Such writings were called palimpsests; and the custom of producing them gave dangerous experience to perpetrators of fraud in the art of effacing written characters by mechanical and chemical means. Plutarch speaks of this practice as one well known. As the price of parchment rose it began to be the habit in the early libraries to efface the letters from parchments «of little value» in order to replace them by more valuable compositions. Dangerous as was such a rule at any time it became fatal to learning when the choice was in the hands of those who were inflamed against their adversaries in controversy, and against all «pagans,» in which class almost all the great authors of our classics were included, and willing to sacrifice the choicest thoughts of the Greeks and Romans in favor of the fanatical dissertations of those they were pleased to call the «faithful.»

When the Caliph Omar put an end to the manufacture and sale of papyrus he caused a wholesale destruction of the writings in the libraries throughout the world. Many scholars believe that the world thus lost great stores of classical literature, the exact magnitude of which can never be ascertained or even estimated. (Consult Gustave Itasse, 'Le Faux devant l'histoire,' etc., from which much of the preceding is taken). According to Adolphe Bertillon (*Revue Scien.* 25, 4 Ser. Vol. VIII, 18 Dec. 1897) the first recorded student of bibliotics was François Demelle in 1609, and the first writer on the subject one Raveneau (1656). In his treatise the latter deplores the lack of science of his colleagues, which however did not prevent their landing him in jail for forgery.

The methods employed in judging the authorship of handwriting by these and almost all later writers on the subject are the same as those relied upon by connoisseurs of painting. They deal exclusively with the pictorial and apparent peculiarities, and the undefined effect these produce upon the mind. The most daring of these methods is the so-called «Graphology,» described in a pamphlet of the Abbé Michon in 1880, which has many conscientious supporters and partial government recognition in Germany and France. This curious study has for its object the revelation of the character and peculiarities of a writer by his handwriting. It would lead to too long a digression should the various claims of the advocates of graphology be reviewed. It must suffice here to say that some of these, not content with finding in the manuscript of an unknown writer personal peculiarities which he already possesses, have imagined they could detect the lurking tendencies to virtuous or vicious deeds such as self-sacrifice, kleptomania, murder, etc., which he has never developed. These are deduced from the pen habits which they think they detect in the writing: such as deliberation, precipitancy, economy of paper or of effect, etc., etc. M. Bertillon thinks «To the public no proof is so decisive as that of personal identification of individuality, yet how many mistakes are made?» He believes with the exception of the advance in photography the art of handwriting judgment is just where Raveneau left it in the reign of Louis XIV. He forgets the aid he himself has rendered to the art of differentiating and identifying handwriting by the application of his anthropometrical measures for the identification of criminals. The former art without such methods is in precisely the state in which Bertillon found the latter before his demonstration that exact measurements of different parts of the body and the relation to each other of the results of such measurements entirely removed the chance of error in identification, whereas there have been many instances of mistaken identity, or denial of identity by a wife or other near relative of the person in question. The history of this minute branch of research resembles that of other and larger branches. Subjective impressions such as those supplied by the feelings, indicating supposed relative amounts or intensities of emotions or sensibility, which were the only guides to the pioneers of inductive research, gave way to exact methods by employment of instruments of precision recording facts in intelligible units, in estimating, for example, degrees of acidity, pitch of sounds, height of temperatures, intensity of lights. One after the other the old subjects of research were furnished with these unequivocal means of recording phenomena, and all the new subjects were required to find such means or forfeit recognition. Thus through mathematics astronomy, already in the van of exact sciences, was enabled to make enormous enlargements of our view of the universe in the last two centuries, and even those objects of research which seemed to defy such treatment were provided with mathematical methods. Psychology became a science admitting experimentation of which the results can be expressed in units, and chemistry is becoming as loyal a subject of that science of relation — mathematics — as its sisters, physics and mechanics.

The purpose of the investigation of a handwriting will determine the kind of examination that is made. If the object be to ascertain whether a particular signature has been legitimately placed as an authentification of a writing, it is necessary to scrutinize the paper on which it is written for evidence of scratching, erasing or other tampering; the ink for peculiarities of constitution which may be inconsistent with its use at that time and in that place. The question of superposition of lines may show that the writing it validates was made after the signature. In numerous criminal trials each of these and of many other unmentioned demonstrable facts have at once stamped documents as fraudulent and obviated the necessity of the more particular study of the character of the writing. (Thus a watermark in a paper on which was written a statement bearing date 1868 represented the German Eagle which was not adopted till after 1870, and this of course showed the whole instrument to be a fraud. A similar conclusion is forced in the case of traced characters purporting to have been written before Hofmann's discovery of the aniline colors yet demonstrably produced by aniline ink). The value of a signature as authenticating a contract is forfeited if it is clear that parts of the body of the document were written after the signature was written. These and other problems in the domain of plassopheny are too numerous to treat in this place and attention will be directed exclusively to the grounds for deciding two specimens of writing to be by the same or by different hands.

The first and most obvious method is to compare their respective features: large or fine writing; perfect or imperfect shaping of the letters; slant or angle of the stems and tails of letters with the line of writing; peculiarities (of which there are always a number) in the forms of individual letters or in the manner of connecting or grouping them; alterations in pressure producing shading in certain directions, and many other similar details. These peculiarities are pictorial. In all genuine writing they arise from the limitations of the writer, first in forming a mental picture of what he wants to produce, and secondly in producing it. Any one of these peculiarities can be easily imitated by another, and indeed all the visible details together can be drawn or traced by a skilful artist, yet in the latter case not without revealing to one using a magnifying glass that the lines have been slowly and carefully drawn and not dashed off with ease. Even if words are photographed or traced from an original and afterward inked, an ordinary magnifying glass will show a difference in the pen marks from the current facility of the original writer. The careful study of such details constituted the entire basis of judgment of the expert till within recent years, and usually they will suffice; for though the forger should know all the minute peculiarities which are disclosed to the patient study of a handwriting, yet he could not reproduce many of them without betraying in the result a painstaking, labored use of the pen which would excite suspicion. Where the same word or signature occurs twice or more in a document the forger must avoid exact repetition of all the minutiæ and at the same time not make such deviations as are inconsistent with the habits of the writer. The most important of these habits for purposes of identification are not pictorial nor immediately apparent to the eye.

Proportions.— Among the most important kinds of characteristics which insensibly influence the judgment in forming a conclusion as to identity of authorship of two specimens of handwriting are the proportions between certain parts of a letter, or word, or group of these, which often occur together. Especially is this the case with a signature, which is written so frequently that the act becomes almost automatic and therefore one in which the peculiarities due to the hand and arm making it, and to the brain furnishing the pattern, are most prominent because without the interference of voluntary effort. The result in fact resembles typewriting where the defects in the levers and type-faces of a typewriting machine can be detected; but with this difference that in handwriting they are still recognizable even when from lack of space or other causes the signature is written smaller or larger than usual. In such cases there is found a greater conformity to the established relations of parts of the signature than any foreign hand could make without a pantograph or other artificial aid. These proportions of parts may be detected either individually by carefully noted measurements, or by composite photographs of genuine signatures. Each method has some advantages over the other. In employing composite photography one attains to an ideal signature because all the possible characteristics of relation

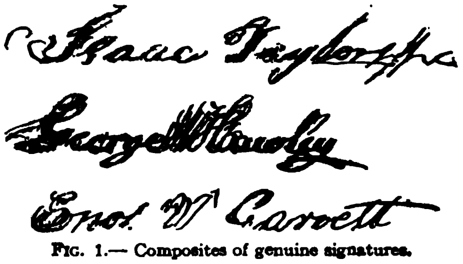


FIG. 1.— Composites of genuine signatures.

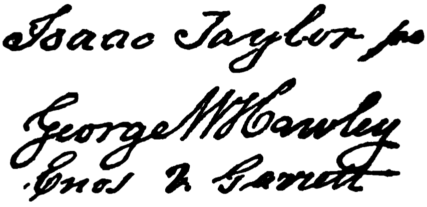


FIG. 2.— Forgeries of the above signatures.

in every signature have been introduced, but on the other hand by this means only a form has been evolved — a graphic average — which must then be made the standard for comparison.

In the case of the method by actual measurements although only a small fraction of the total number of relations is noted, yet these are in numerical form and can be averaged and the results compared directly.

The principle on which the method by investigation of proportions of parts rests is that the spaces between various distinctive points of a signature bear numerical relations to each other, and to the heights of certain letters, which are constant within comparatively narrow limits whether the signature be written small or large.

The following illustration (Fig. 3) represents a small part of a letter written with pen and ink and photographed at an enlargement of 30 diameters:

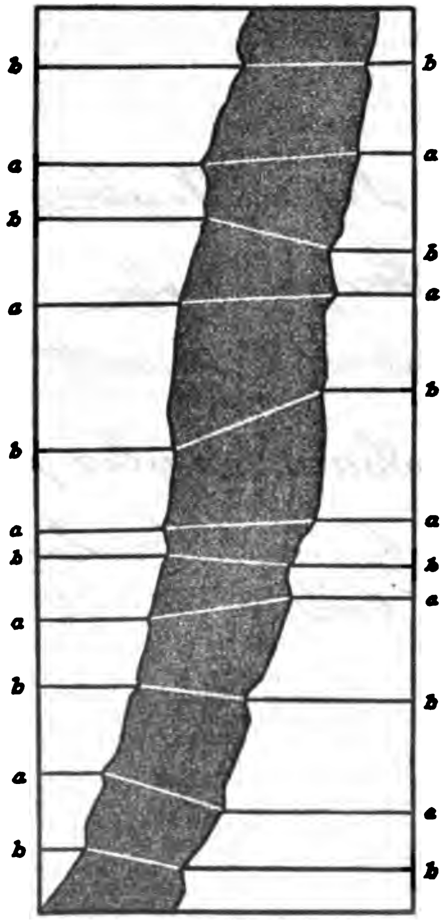


FIG. 3.— The points *a* show the widest and *b* the narrowest parts of the ink lines. It is to be noted that the maxima and minima of the two margins are not always opposite to each other, but show a tendency to oscillate about a horizontal line so that the *a*'s and *b*'s of one margin will be observed alternately above and below such line in following the ink mark downward, while those of the other margin will be found in opposite phase. This is made clearer by the white lines uniting the *a*'s and *b*'s of the opposite margins. This can be accounted for by the simultaneous operation of lateral and vertical movements which are not coincident in period.

Tremograms.— Another valuable individuality in writings executed by means of pen and ink are the irregularities observed in the margins of the lines when examined under a sufficiently high power of the microscope (about 120 diameters). How far this examination will enable one to identify an individual is not yet known, but it has been established that there are characters in the general disposition, number, arrangement and position of these serrations, which remain comparatively constant in the writings of the same individual with different pens, ink and paper, and under different mental and physical conditions, and which therefore cannot have other source than peculiar motions imparted to the writing instrument and writing fluid by the writer.

Inks.— Tables for the determination of the character of inks by qualitative chemical tests have been published by Robertson, Hofmann and others. To the same end special devices have been made to solve questions relating to the composition of inks without affecting the document or writing fluid: Doremus by means of the spectroscope, Frazer through absorption of light admitted to and reflected by the ink through colored prisms. Sharples has shown that an otherwise invisible record may be made visible through shorter or longer exposure to the sensitive plate of the photographic camera, etc.

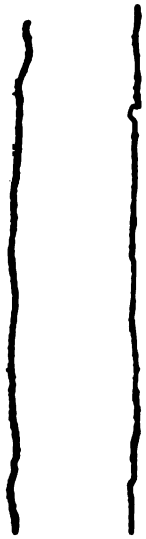


FIG. 4.— A tracing by camera lucida of the margins of an ink line drawn by a pen fixed to a ruling machine. It is enlarged 60 diameters. There is an absence of the irregularities always found in the margins of ink lines made by the human hand.

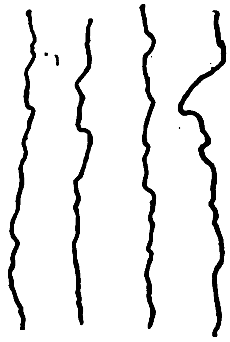


FIG. 5.— Camera lucida tracings of the margins of two ink lines by the same hand made at an interval of 52 days. The similarity of character of the serrations in both is noticeable.

Bibliography.— Chabot, 'The Handwriting of Junius Professionally Investigated,' with a preface and collateral evidence, by the Hon. Edward Twisleton (1871); Cross & Bevan, 'A Text-Book of Paper-Making' (1888); S. Weir Mitchell, M. D., 'Mary Reynolds: a Case of Double Consciousness' with a letter on the handwritings peculiar to each of the two states by Persifor Frazer). Transactions of the College of Physicians of Philadelphia (April 4, 1888); Galton, 'Decipherment of Blurred Finger-Prints' (1893); Persifor Frazer, 'Bibliotics or the Study of Documents' (1894);

Hagan, 'Disputed Handwriting' (1894); Bertillon, 'La comparaison des écritures et l'identification graphique' (*Revue Scientifique*, 18 Dec. 1897 and 1 Jan. 1898); Itasse, 'Le faux devant l'histoire, devant la science, et devant la loi' (1898); Persifor Frazer, 'Des faux en écriture et de l'écriture. Traduit par M. L. Vossion et Mme. H. Bouett' (1899); Minovici, 'Les faux en écriture et la photographie au service de la justice'; Ames, 'Forgery, its Detection and Illustration' (1900).

Persifor Frazer,
Docteur ès-Sciences Naturelles Univ. de France.

HANDY ANDY, a novel by Samuel Lover, published in 1842. It is a broadly humorous tale of life among the Irish gentry and peasantry in the first half of the 19th century.

HANFORD, Cal., city and county-seat of Kings County; on the Southern Pacific and Santa Fe railroads, about 30 miles southeast of Fresno, and 250 miles south of San Francisco. It was first settled in 1871 and was made a city in 1891. Its chief industries are agriculture, fruits, raisins and livestock. It has also flour and planing mills, milk condensing factory, butter and cheese factories, etc., and is a distributing centre for food products and clothing sent to mining sections in the vicinity. The city government is by a board of trustees, the board choosing its own chairman. The city has a Carnegie library and sanitaria. Pop. 4,829.

HANFSTÄNGL, Franz, frănts hănf'-stengl, German lithographer: b. Rain, Germany, 1804; d. 1877. He studied art at the Munich Academy, and in 1826 went to Dresden where he began his series of lithographic copies of pictures in the Dresden Gallery, which he completed in 1852. He later returned to Munich, leaving his establishment at Dresden to his brothers Hans and Max. During the latter part of his life he devoted himself to photography and kindred processes. His son Edgar succeeded him in the business in 1868. The important periodical *Die Kunst unserer Zeit* is published by his firm.

HANG-CHOW, häng'chou', China, the capital of the province of Che-kiang, on a plain at the southern terminus of the Imperial Canal, and within two miles of the head of the estuary of the Tsien-tang River, about 50 miles from the open sea, and nearly 100 miles southwest of Shanghai. It is a strongly fortified city of oblong form, surrounded with high well-built walls about 12 miles in circuit, enclosing many large vacant spaces. The streets are paved and moderately clean, and there are numerous triumphal arches, monuments to great men and gorgeous Buddhist temples. The stores and warehouses are noted for their size and the quantity and quality of the goods displayed. More than 100,000 persons are employed in silk manufactures, and among other industries are the weaving of cotton, manufacture of tapestries, carving in ivory, the making of lacquered ware, fans and screens, etc. The houses generally are one story high. A large portion of the inhabitants reside in the suburbs, and in boats on the waters around them. The governor-general of Che-kiang and Fe-kien resides in this city, and also the governor of the province. With their courts and troops, in addition to the great trade passing through, and its activity as a centre of literary and ecclesiastical life, Hang-Chow is one of the most important and richest cities in China. The river, opposite the city, is about four miles broad at high-water, and is crowded with vessels of all descriptions, being the channel by which vast quantities of merchandise are received from and exported to the southern provinces. The extensive lake of Si-hou, "West Lake," close by the city, is celebrated for its natural and artificial beauties. Chapu, the seaport of Hang-Chow, is 20 miles down the river. Hang-Chow is the celebrated "Kinsai or Kinsay" of Marco Polo — the capital, in his time, of southern China. No chapter in Marco Polo's narrative is of greater interest than the pages devoted to this city, which appears to have been then to the Chinese what New York is now to Americans. It was captured by the Taiping rebels in 1861, and deserted by all its rich or respectable inhabitants. A disciplined force of Chinese, under the command of French officers, united with the Imperialist troops, recaptured the city on 31 March 1864. By the Treaty of Shimonoseki (1895) it was opened to foreign trade the following year; and a district of about 300 acres has been set apart for a foreign settlement, but Shanghai sustains to it the relation of agent or middleman, receiving both exports and imports — to be either distributed throughout the world or merely forwarded to Hang-chow consignees. Pop. 600,000.

HANGING, a form of capital punishment inflicted under the common law; also a mode of death sometimes lawlessly visited upon a person, or occurring from accident, or by suicide. In cases of hanging, death seldom results from pure asphyxia, but is usually in some degree owing to apoplexy and injury to the spinal cord. In attempted suicide, bleeding from the jugular vein and artificial respiration may be tried for resuscitation. In difficulty of inducing artificial respiration, laryngotomy and tracheotomy should be performed, and the lungs inflated through the opening in the neck. In judicial hanging, the noose ought to be so adjusted as to produce immediate dislocation of the spinal column, death in that case being instantaneous. In a number of States electrocution as capital punishment is substituted for hanging. While death by hanging or other means is the usual punishment for first degree murder, in many States it is also inflicted for rape and arson of the first degree. In several American States infliction of the death penalty is forbidden by law. Hanging, drawing and quartering were once the punishment of treason in England. See CAPITAL PUNISHMENT.

HANGING ROCK, Battle of, fought 6 Aug. 1780. It occurred on Hanging Rock Creek, S. C., between Colonel Sumter's Americans, some 800 in number, and about as many Loyalists commanded by Major Carden. After driving back the Loyalists, the Americans, becoming disorganized while plundering the enemy's camp, were in turn put to flight. The American loss is unknown; that of the Loyalists, in killed, wounded and missing, is recorded as 269. Consult Lossing, 'Field-Book of the American Revolution.'

HANGING VALLEY, a tributary that enters its main or trunk valley by means of a fall or rapid, that is, with discordant junction. Hanging valleys may be produced by a variety of causes, but the most important is believed to be overdeepening of the main valley by glacial erosion. They are conspicuous features of mountain landscapes in glaciated regions. The famous falls of Yosemite Valley are from hanging tributaries.

HANKOW, hän-kow' («Mouth of the Han»), China, a city and river-port in the province of Hu-peh, at the junction of the Han with the Yang-tse (Yangtsze or Yangtze) River, 600 miles above the mouth of the Yang-tse, which is navigable for large vessels up to the town. On the opposite bank of the Han is Hanyang, on the other side of the Yang-tse is Wuchang, the three together forming one immense city (for such it is virtually and in the estimation of many of the inhabitants). In addition there is a large floating population, the Han being densely crowded with junks for about half a mile above its mouth. In 1857 the city was almost totally destroyed by the Taipings. The port was opened to foreign trade by the Treaty of Tientsin, ratified in 1860; and soon became the chief emporium for the tea trade of the central provinces. Revolutionists in 1911 attacked and set fire to the city; in 1912 they captured it and made it the provisional capital. A concession of about 90 acres of land apart from Chinese jurisdiction is laid out like an English town. The residents of the British concession are formed into a municipality, with a council empowered to levy taxes. There are also German, French and Russian settlements. The foreign trade of this port is well described by the consul-general of the United States who writes (15 July 1916) that Hankow is a flourishing city with many modern conveniences and with a trade passing through the maritime customs valued at $113,940,933 in 1915, exclusive of treasure and coins, which amounted to $20,957,909 — the foreign trade being equal to that of the port of Baltimore in 1914. Imports from foreign countries and Hongkong in 1915 were valued at $17,088,093 and from other Chinese ports, $15,757,526, showing a reduction in the imports of more than $10,000,000 occasioned by the European War. A statement of the direct trade of the port of Hankow with foreign countries in 1914 and 1915 derived from the maritime customs returns shows, for the former year, imports from Belgium valued at $1,624,151; from British India $1,863,497; from Dutch East Indies $1,416,507; from Germany $1,159,046; from Great Britain $3,138,921; from Hongkong $2,329,116; from Japan (including Taiwan) $9,406,170; from the United States (including Hawaii) $2,936,400. In 1915 we find imports from the United States (including Hawaii) $2,637,262; British India $1,980,275; Dutch East Indies $1,331,106; Great Britain $1,706,269; Hongkong $1,778,703; Japan (including Taiwan) $7,297,795. We omit the countries the imports from which amounted to less than $1,000,000. Belgium and Germany disappeared entirely from the list. The chief article of export is tea (valued at $17,917,665 in 1915). An estimate of the population of the city in the larger sense is 1,321,280; of Hankow alone and in the narrower sense, about 830,000.

HANNA, Edward J., American Roman Catholic archbishop: b. Rochester, N. Y., 21 July 1860. He was educated at the Rochester Free Academy, the College of the Propaganda, Rome, and he afterward worked at the University of Cambridge, England, and the University of Munich. He was ordained to the priesthood of the Roman Catholic Church in 1885; made doctor of divinity in 1886 and immediately afterward was appointed teacher at the Propaganda, Rome, and remained there one year. From 1893 to 1912 he was professor of theology at Saint Bernard's Seminary, Rochester, N. Y. On 22 Oct. 1912 Pope Pius X appointed Dr. Hanna auxiliary bishop of San Francisco and on 4 Dec. 1912 he was consecrated titular bishop of Titoplis and immediately took up his duties of auxiliary bishop. On 1 June 1915 he was appointed archbishop of San Francisco in succession to the late Dr. Riordan and on 16 Sept. 1913 Governor Johnson appointed him commissioner of immigration for the State of California.

HANNA, Marcus Alonzo, American politician: b. New Lisbon, Ohio, 24 Sept. 1837; d. 15 Feb. 1904. In 1852 his family moved to Cleveland, where he was educated in the public schools and he also took a year's course of study in Western Reserve University. He left college to enter the grocery trade with his father, and later had entire control of the business. In 1867 he became a partner with his father-in-law in the firm of Rhodes and Company, engaged in handling coal and iron; he soon mastered the details of the business, greatly extended the work of his firm and was the first to build steel steamships for the lake trade. In 1877 he became the controlling partner of the firm, the name of which was changed to M. A. Hanna and Company, and acquired large interests in lake navigation. He also was for a time manager of a theatre, and president of the Union National Bank of Cleveland, and of the Cleveland City Railway Company. In 1880 he organized a business men's political club, and from that time was active in politics. In 1884 he was sent as a delegate to the Republican National Convention, and in the next convention (1888) was John Sherman's political manager. He first gained a national reputation, when he obtained the nomination of McKinley for President at the Convention of 1896, and as chairman of the Republican National Committee conducted the Presidential campaign, which resulted in a large plurality for McKinley. In this campaign he adopted the methods which had made him successful in business, studying the situation and its needs, and carefully attending to details. In 1897 he was appointed United States senator to succeed Sherman, who resigned before the completion of his term of six years. In 1898 he was elected to a full term, and in 1904 re-elected, but died before taking his seat. In 1900 he again conducted the Presidential campaign. As a large employer of labor, Senator Hanna had a number of questions to settle with his own employees, and as a rule won their respect and confidence by his fairness and willingness to listen to their claims. He was a firm believer in arbitration between labor and capital, and was active in the organization, in 1901, of the National Civic Federation, a non-partisan organization formed to consider such topics as trusts, tariffs, taxation, etc., becoming its president, and a member of a permanent committee appointed to consider and settle labor disputes.

HANNAH, one of the wives of Elkanah and the mother of the prophet Samuel. Her story is told in 1st and 2d Samuel.

HANNAY, David, English journalist: b. London, 25 Dec. 1853. He was educated at Saint Peter's College, Westminster and for some time was British vice-consul at Barcelona. Entering journalism he was successively connected with the *Pall Mall Gazette,* the *Saturday Review,* and *Saint James' Gazette.* He is also the author of several historical works, including 'Short History of the Royal Navy' (1898); 'Life of Admiral Blake' (1888); 'Rodney' (1891); 'Life of Captain Marryat' (1889); 'Life of Smollett' (1888); 'Don Emilio Castelar' (in 'Public Men of To-Day Series,' 1896); 'The Later Renaissance' (in 'Periods of European Literature,' 1898); 'Ships and Men' (1908); 'Navy and Sea Power' (1913); 'Porfirio Diaz' (1918).

HANNAY, James, Canadian historian and journalist: b. Richibucto, N. B., 22 April 1842; d. 12 Jan. 1910. After many years of editorial work upon influential Canadian and American journals, he became official reporter of the New Brunswick provincial parliament. Among his works are 'History of Acadia' (1879); 'History of the Loyalists' (1893); 'The Story of the Queen's Rangers' (1883); 'Sir Leonard Tilley' (1897); 'History of the War of 1812'; 'New Brunswick: Its Resources and Advantages' (1902).

HANNAY, James Owen («George A. Birmingham»), Irish clergyman and novelist: b. Belfast, 16 July 1865. He was educated at Temple Grove, East Sheen, Haileybury, England, and at Trinity College, Dublin. He received priest's orders in the Church of Ireland in 1889; was curate of Delgany, County Wicklow, and from 1892 to 1913 was rector of Westport, County Mayo. In 1901–02 Dr. Hannay was Donellan lecturer at Dublin University and from 1905 to 1915 was member of the General Synod of the Church of Ireland. In 1912 he was appointed canon of Saint Patrick's Cathedral, Dublin, and in 1916 received the temporary appointment of chaplain to the forces. Canon Hannay has gained literary fame through his novels which are keen analyses of contemporary Irish life. His numerous works include 'The Spirit and Origin of Christian Monasticism'; 'The Wisdom of the Desert'; 'The Seething Pot' (1905; 1912); 'Hyacinth' (1906); 'Talages' Lovers'; 'The Red Hand of Ulster' (1912); 'Northern Iron' (1913); 'The Adventures of Dr. Whitty' (1913); 'The Search Party' (1913); 'The Lost Tribes' (1914); 'From Connaught to Chicago' (1914); 'Minnie's Bishop and other Stories' (1915); 'Gossamer' (1915). Other works are 'The Lighter Side of Irish Life' (1912); 'The Major's Niece' (1912); 'Spanish Gold' (1911); 'Irishmen All' (1913); the plays 'General John Regan,' (produced in New York 1913) and 'Eleanor's Enterprise' (produced 1911).

HANNELE. Hauptmann's dream play, 'Hanneles Himmelfahrt' ('Hannele's Ascension') was first played 14 Nov. 1893 at the Royal Theatre in Berlin and won for its author the Grillparzer prize, but failed to obtain the Kaiser's sanction for the Schiller prize. Driven by the brutality of a drunken foster father to despair, the orphaned Hannele, a child of 14, throws herself into the village pond on a cold winter's night, thinking that she is obeying the call of the Lord Jesus. Rescued, she is put to bed in the poorhouse, where in her delirium she gives utterance to fancies never uttered and her love for the only person who had ever been good to her, the village school-teacher. These fancies, in which the fairy tales of Cinderella and other children's lore are mingled with biblical stories, are boldly but poetically put upon the stage in scenes that alternately dissolve from imagination into reality before the spectator until the poor child dies. Along with the angels, appear her dead mother, and the teacher Gottwald is transformed into the figure of Christ. In this Hauptmann was unquestionably influenced by Fritz von Uhde's wonderful conceptions of biblical scenes. Hence the accusations of blasphemy showered upon him until the defense of acknowledged religious leaders and writers gradually silenced the outcry. Then the play was attacked for its social-democratic tendencies, while its romantic imagery raised up the accusation of treason to naturalism, for which Hauptmann had stood. True, his first dramas had portrayed the anguish and misery of the human soul predominantly, but with 'Hannele' he commences to stress the human «longing for heaven» of which that «Weltweh» is the root, retaining the rest of the technique of naturalism.

Editions: Gerhart Hauptmann's 'Hannele,' Berlin 1894 (really 1893); title later changed to 'Hannele's Himmelfahrt' (Berlin 1906, 15th ed.). Consult Emil Sulger-Gebing, 'Gerhart Hauptmann' (Leipzig 1909, chap. 5). There are English translations by Charles H. Meltzer (New York 1908); G. S. Bryan (Boston 1909); and William Archer (London 1894).

Carl E. Eggert.

HANNIBAL, Carthaginian soldier: b. 247 B.C.; d. probably 183 B.C. He was the son of Hamilcar Barca (q.v.) and at the age of nine his father made him swear at the altar eternal hatred to the Romans. He was a witness of his father's achievements in Spain; but Hamilcar having fallen in battle in Lusitania, in 228 B.C., and his son-in-law Hasdrubal having been appointed to succeed him, Hannibal returned home. At 22 he returned to the army at the request of Hasdrubal. The soldiers perceived in him the spirit of Hamilcar, and in three campaigns his talents and his courage were so conspicuous that the army, on the murder of Hasdrubal in 221, conferred on him the chief command by acclamation. In 219 B.C. he laid siege to Saguntum, a town which had concluded an alliance with Rome. In eight months Saguntum fell. The Romans, alarmed by this, sent ambassadors to Carthage to demand that Hannibal should be delivered up. The demand being refused, they declared war. Hannibal raised a powerful force, and conceived the design of attacking the Romans in Italy. After providing for the security of Africa, and having left his brother Hasdrubal with an army in Spain, he began his march with 90,000 foot-soldiers, 40 elephants and 12,000 horsemen, traversed Gaul in the depth of winter with incredible rapidity, and reached the foot of the Alps. In nine days he crossed these mountains, probably by the pass leading over the Little Saint Bernard. The conquest of the Taurinians and the capture of their chief city encouraged the people of Cisalpine Gaul to join him. These auxiliaries would have been still more numerous had not Publius Scipio approached at the head of a Roman army, which had landed at Pisa. On the banks of the Ticinus the armies engaged, and a charge of the Numidian horse left Hannibal master of the field (218 B.C.) Scipio avoided a second battle, and retreated beyond the Trebia, leaving the strong town of Clastidium in the enemy's hands. Meanwhile Sempronius arrived with a second army, but Hannibal soon provoked his impetuous adversary to an engagement, dispersed an ambuscade near the Trebia and surrounded and destroyed the Roman forces. The Romans lost their camp and 26,000 men. Hannibal now retired to winter quarters among his allies in Cisalpine Gaul; and at the opening of the next campaign (217) found two new armies awaiting his approach in the passes of the Apennines. He determined to engage them separately, and destroy Flaminius before the arrival of his colleague. He deceived him, therefore, by feigned marches, crossed the Apennines and traversed the Clusian marsh. He then employed every means to compel Flaminius to a battle. He wasted the whole country; feigned a march to Rome; but suddenly formed an ambush in a narrow pass surrounded by almost inaccessible rocks. Flaminius, who followed him, was immediately attacked. A bloody engagement took place near the Lake Trasimenus. Assailed on every side, the Roman legions were cut in pieces. Hannibal now armed his soldiers in the Roman manner and marched into Apulia, spreading terror wherever he approached. Rome, in consternation, entrusted her safety to Fabius Maximus, the dictator, who determined to exhaust by delay the strength of the Carthaginians. He attacked Hannibal with his own weapons, and hung upon him everywhere without attempting to overtake him, convinced that the Carthaginians could not long hold a desolated territory. Hannibal marched into the plains of Capua, with the design of separating the terrified cities from their alliance with the Romans, and drawing down Fabius from the mountains. But suddenly he found himself in the same toils in which Flaminius had perished. Shut up between the rocks of Formiæ, the sands of Liternum and impassable marshes, he was indebted for his safety to a stratagem. Having collected a thousand oxen, and fastened burning torches to their horns, he drove the animals at midnight into the defiles guarded by the Romans. Panic-struck at the terrible sight, the Romans abandoned the heights, and Hannibal forced his way through their ranks. Minutius Felix, master of the horse, was then made colleague of Fabius in the dictatorship. Eager for combat, he fell into an ambush at Geronium, and would have perished but for the aid of Fabius. After this campaign the other Roman generals seemed unwilling to trust anything to chance, and imitated the delay of Fabius. Hannibal saw his army slowly wasting away, when the new consul, Terentius Varro, an inexperienced and presumptuous man, took the command of the legions. Hannibal had occupied Cannæ, and reduced the Romans to the necessity of risking an engagement (216). Æmilius Paulus, the colleague of Varro, wished to put off the battle, but Varro chose the day of his command, and directed the attack. The Roman army was destroyed, and Hannibal now marched to Capua, which immediately opened its gates. In 215 B.C. Hannibal sustained, at the hands of Marcellus, a repulse before Nola — the first check which he had received in the open field — but in 212 B.C. made an important acquisition in the capture of Tarentum. Capua, however, was invested by two consular armies, and was on the point of surrendering. Hannibal marched to Rome, and encamped in sight of the capitol, 211 B.C.; but the Romans were not thus to be discouraged; Capua fell. This success gave the Romans a decided superiority, and nearly all the people of Italy declared in their favor. Held in check by the consul, Claudius Nero, Hannibal could not effect a union with his brother Hasdrubal, who had set out from Spain with reinforcements, but after having passed the Apennines was attacked and defeated by Nero on the Metaurus in 207 B.C. Hasdrubal fell, and his bloody head was thrown into the camp of Hannibal. The latter then retired to Bruttium, where, surrounded with difficulties, he yet maintained the contest with inferior forces against victorious armies. But Scipio now carried the war into Africa, and Hannibal was recalled to defend his country. He reluctantly embarked his troops, and in 203 B.C. left the country which for 16 years he had held in spite of all the efforts of Rome. He landed at Leptis, gained over a part of the Numidians, and encamped at Adrumetum. Scipio took several cities, and reduced the inhabitants to slavery. Pressed by his countrymen to come to a decisive engagement, Hannibal met Scipio at Zama, and was defeated with 20,000 loss. Peace was concluded in 201 B.C. Hannibal, accused by his enemies of stirring up Antiochus the Great to war against the Romans, went to Ephesus, to the court of Antiochus. In the ensuing struggle with Rome, Antiochus was signally defeated, and obliged to conclude a peace, one of the terms of which was that Hannibal should be delivered up. Hannibal, again obliged to flee, went to the court of Prusias, king of Bithynia. Prusias, to whom the Senate had sent ambassadors to demand the person of Hannibal, was on the point of complying with the requisition, when Hannibal prevented the disgrace by swallowing poison, which he always carried about in his ring.

HANNIBAL, Mo., the metropolis of northeast Missouri, is located in Marion County, about 120 miles northwest of Saint Louis. Hannibal has excellent railroad facilities — the Missouri, Kansas and Texas system; the Chicago, Burlington and Quincy; the Wabash and the Saint Louis and Hannibal railroads. Hannibal was formerly a large lumber market and when this industry moved northward the city lost in population until 1900, when a campaign was started to secure factories for the city. Hannibal increased in population between 1900 and 1910 45 per cent and in manufacturing 237 per cent. The chief products of the Hannibal factories are cement, lime, stoves, car wheels, flour, shoes, etc. Hannibal is connected with Illinois by a steel bridge which is used by the railroads and for vehicles. The city has a free library; splendid school system, 18 grade schools, one high school and two parochial schools; two hospitals; a Y. M. C. A.; a $100,000 city hall, and other fine public buildings. It has a municipal electric-light and power plant which has been one of the most successful in the United States. The rates are lower than in any city in the Mississippi Valley, and two years ago the water plant was purchased by the city. The city government is composed of a mayor and two aldermen from each of the six wards of the city. Pop. 21,766.

HANNINGTON, James, English clergyman, first bishop of Eastern Equatorial Africa: b. Hurstpierpoint, England, 1847; d. near Lake Victoria Nyanza 1885. After studying at Oxford he was ordained in the Established Church and then undertook missionary work. In 1882 he was at Uganda, but enfeebled health forced him to return to England. In 1884 he was appointed to the bishopric of Eastern Equatorial Africa, but in spite of his superhuman efforts to establish friendship with the natives, he was murdered soon after his arrival at the interior. His journals were published at London in 1888. Consult Berry, 'Bishop Hannington' (New York 1908).

HANNO, hăn'ō, or **ANNO,** German mediæval prelate: b. not earlier than 1000; d. Siegberg, near Bonn, 1075. The emperor, Henry III made him his chancellor and presented him to the archbishopric of Cologne, to which he was consecrated in 1056. After the death of Henry III, Hanno made himself master of the person of Henry III's young son, Henry IV and secured for himself the administration of the empire (1062). His energetic government and his holy life, his paternal care for his see, his zealous reformation of monasteries and foundation of churches, gained him the character of a saint. The hymn in his praise is by some thought to have been written soon after his death; by others about 1183. It is one of the most important monuments of the early German national literature. The best version of it is to be found in Müllenhoff and Scherer's 'Denkmäler deutscher Poesie und Prosa' (1864).

HANNUKAH. See BEFANA.

HANOTAUX, (Albert Auguste) Gabriel, ăl-băr ō-güst gä-brē-ĕl ä-nō-tō, French politician: b. Beaurevoir, Aisne, 19 Nov. 1853. He chose for himself the profession of the law, took a scientific course in the Ecole des Chartes and afterward became a teacher in the Ecole des Hautes Etudes. In 1879 he received an appointment in the French foreign office; in 1881 became a member of the Cabinet and was sent to Constantinople as Ambassador in 1885. From 1886 to 1889 he was Republican deputy and in May 1894 received the portfolio of foreign affairs in the second Dupuy Cabinet, remaining in office until October 1895. He held the same office in the Méline ministry 1896-98 and was an ardent supporter of the policy culminating in the Franco-Russian alliance. He became a member of the Academy in 1897. He has published 'Les Villes Retrouvees' (1880); 'Origines de l'institution des intendants des provinces' (1884); 'Henri Martin sa vie ses œuvres, son temps' (1885); 'Etudes historiques sur le XVIe et le XVIIe siècle en france' (1886); 'Histoire du cardinal de Richelieu' (1893); 'La France et la royauté avant Richelieu' (1898); 'La Seine et les quais, promenades d'un bibliophile' (1901); 'Du choix d'une carrière; (1902); 'Souvenirs de Mme. Maintenon' (1902); 'La jeunesse de Balzac' (1904); 'Histoire de la France contemporaine' (1909); 'La France vivante en Amérique du Nord' (1913); 'La paix Latine'; 'Fachoda'; 'Jeanne d'Arc,' etc.

HANOVER, Germany, the northwesternmost province of Prussia, prior to 1866 an independent kingdom. It borders on the North Sea and has an area of 14,862 square miles. In the south the Harz Mountains attain an altitude of over 3,000 feet; the rest of the country is an alluvial plain with a gentle slope to the sea. The Elbe on the northeast boundary, the Ems, and the Weser, with its tributaries, the Leine and Aller, are the principal rivers. Coal and lignite, rock salt, iron, copper, zinc, silver, mineral oil and gold are found in the mountainous districts, and there are large peat beds in the north. The coast is low and as in Holland is protected by dykes from the incursions of the sea. There are only two lakes of considerable size, the Dümmersee and the Steinhinder Zee. Over one-third of the area is arable land, producing large quantities of grain and flax. Clover and tobacco are also grown and the sugar-beet industry is acquiring large proportions. The keeping of bees is generally practised on the moors, and a breed of superior cattle is raised along the marshy coast land. Forests of hardwood and pine, extensively used in smelting, occupy one-sixth of the surface. The manufactures are extensive and include shipbuilding, iron goods, machinery, woolens, linens, cottons, leather, paper, beet-root sugar, beer, spirits and numerous domestic commodities. Hanover has over 2,000 miles of railroads, numerous canals and an extensive traffic is carried on at its several ports, among which are Geestemünde, Emden and Harburg, although practically its chief port is the free city and port of Bremen (q.v.). The capital is Hanover (q.v.). For administrative purposes, the province is divided into the six districts of Hanover, Hildesheim, Lüneburg, Stade, Osnabrück and Aurich. The highest court is in Celle. The province sends 36 members to the Prussian Chamber of Deputies, 10 to the Upper House and 19 to the German Reichstag. Education is compulsory and free; chief of the higher institutions of learning is Göttingen University. There were 3,624 public grammar schools in 1915 with 8,586 teachers and 470,465 pupils. There were 103 secondary schools with 28,971 pupils. There are a mining academy situated at Clausthal, a building school in Nienburg and a forestry school at Münden, a technical high school in Hanover, five navigation schools and several agricultural institutions. There are two large libraries, one at Göttingen

University and the Royal at Hanover. The majority of the inhabitants are Lutheran Protestants. Roman Catholics inhabiting Hildesheim and Osnabrück constitute about one-seventh of the population. Hanover was long connected with the Brunswick family, a scion of which, Ernest Augustus, in 1692 became the first Elector of Hanover. He married the daughter of the Elector Palatine, granddaughter of James I and niece of Charles I of England. He was succeeded in 1698 by his son, George Louis, who in accordance with the Act of Settlement (q.v.) became George I, king of England, at the death of Queen Anne in 1714. The connection with England continued during four reigns, and in 1814 the Congress of Vienna raised Hanover to the rank of a kingdom, George IV and William IV thus being kings of Great Britain and of Hanover. On the accession of Queen Victoria, however, by the Salic law, the Hanoverian crown passed to the nearest male heir, Ernest Augustus, Duke of Cumberland, and at his death in 1851 to his son, George V. In 1866 Hanover sided with Austria in the Austro-Prussian contest; the capital was occupied by Prussian troops; the king lost his throne, his estates were sequestrated and Hanover was annexed to the Prussian dominions. George V, who died in 1878, and his son, Ernest Augustus, Duke of Cumberland, went into exile rather than recognize the act of annexation. A long protest against annexation was continued in the Reichstag by the Hanoverian deputies; finally in 1892 Ernest Augustus renounced his claims and in 1913 the two houses of Guelph and Hohenzollern were reconciled and Ernest Augustus, son of the Duke of Cumberland, married Victoria Louise, daughter of Kaiser Wilhelm II. Consult Ford, 'Hanover and Prussia' (New York 1903); Grotefend, 'Geschichte der Verfassung des Königreichs Hannover, 1814–48' (Hanover 1857); Guthe, 'Die Lande Braunschweig und Hannover' (Hanover 1888); Havemann, 'Geschichte der Lande Braunschweig und Lüneburg' (Göttingen 1853–57); Köcher, 'Geschichte von Hannover und Braunschweig, 1648–1714' (Leipzig 1896); Meding, 'Memoiren zur Zeitgeschichte' (ib. 1884); Meyer, 'Die Provinz Hannover' (Hanover 1888); Sybel, 'Die Begründung des deutschen Reichs durch Wilhelm I' (Munich 1893; Eng. trans., New York 1890–92); Ward, 'Great Britain and Hanover' (Oxford 1899). Pop. 2,942,436.

HANOVER, Mass. (1) Village in the town of Hanover in Plymouth County, on a branch of the New York, New Haven and Hartford Railroad, about 10 miles east by north from Brockton and 25 miles southeast of Boston. It is the seat of Hanover Academy. It is situated in an agricultural region and the chief industries are connected with agricultural products. Its chief manufactures are tacks and nails. (2) The town of Hanover contains several villages and the chief manufactures are shoes, nails, tacks and dairy products. Pop. of the village is about 420; of the town, 2,326.

HANOVER, N. H., town in Grafton County, on the Connecticut River and on the Boston and Maine Railroad, about 72 miles northwest of Concord. It is situated in an agricultural region and its industries are connected chiefly with farm products and lumbering. It is a summer resort, but is known principally as a college town, being the seat of Dartmouth College (q.v.). It contains also the Mary Hitchcock Memorial Hospital. Pop. 2,075.

HANOVER, Pa., borough in York County; on the Western Maryland and the Pennsylvania railroads, about 32 miles south of Harrisburg. It was settled about 1729 and incorporated in 1815. It is in a rich agricultural section of the State, and nearby are iron-ore mines. The chief manufactures are shoes, machine-shop products, cigars, gloves, flavin, auto truck bodies, wire cloth, furniture, heels and innersoles, silk and cordage. Hanover is the commercial centre of a considerable part of York County; the trade is largely in agricultural and dairy products, the manufactures of the borough, and in live stock. The government is vested in a burgess and borough council. Pop. 7,057. Estimate, including suburbs, about 12,000.

HANOVER, Prussia, the capital of a province, and formerly of the kingdom of Hanover, in an extensive plain northeast of and dominated by Mount Linden, at the confluence of the Ihme with the Leine, 44 miles by rail west by north of Brunswick. It is the twelfth city of Germany in size and the seventh in Prussia. It consists of an old town, intersected by the Leine, and of various modern suburbs. The old town is unattractive, but the new quarters are regular and well built. The principal features are the Markt Church, of antique appearance; the Kreutz Church; Schloss Church, a handsome structure, with an altar-piece by Cranach, and some curious relics collected by Henry the Lion; several handsome modern churches; the palace (1636–40, rebuilt since 1817), now a royal Prussian residence; the former palace of King Ernest Augustus (in government occupancy); the Royal Library; the museum of art and science; the restored town-house (1439–55); the new town-house (formerly palace of George V); the Kestner Museum of Antiquities; the provincial assembly house; the Franco-German War monument; the Waterloo monument; various schools, among which is the technical high-school, a remodeled building of great extent, formerly the Welfenschloss (palace of the Guelphs), and the Schloss-Herrenhausen, formerly a royal residence. It is popular as an educational centre for foreigners, who are attracted thither by the purity of the spoken language here and by the quiet charm of the city. There is also a veterinary high school, several teachers' training schools, several lyceums and military and industrial schools. The Royal Library contains over 200,000 volumes and a valuable collection of manuscripts. In the municipal library there are also several valuable manuscripts. The museums and various collections contain a great selection of antiques of all kinds. As capital of the province the city is the seat of the presidency and the higher courts. The city government is vested in a director, a syndic, an executive board of 17 magistrates and a municipal council of 24 members. The city has attained some industrial importance since the improvement and development in its railway connections. Trade and industries are important, the latter including railway works, oilcloth, bridge works, pianos, asphalt, leather, machinery, iron castings, cotton, linen, tobacco, lacquered wares, lamps, glass, chemicals, etc., breweries and distilleries. The city has electric street railroads.

Hanover is first mentioned in 1163. It joined the Hanseatic League in 1481, and received the Reformation in 1533. It became the residence of the dukes of Brunswick-Lüneburg, and the capital of the principality in 1636. In 1714, however, the Elector of Hanover became king of England as George I and until the death of William IV in 1837 Hanover was a provincial town of little importance. In 1866 the kingdom was absorbed by Prussia, and since 1890 the city has held the positions of a royal residence and capital. Sir William Herschel, the two Schlegels and Iffland were born here. The city has grown and prospered under Prussian rule. Consult Hartmann, 'Geschichte der Residenz-stadt Hannover' (Hildesheim 1886); Hirschfeld, 'Hannovers Grossindustrie und Grosshandel' (1891); Hoppe, 'Geschichte der Stadt Hannover' (Hanover 1845). Pop. 302,375.

HANOVER, Pa., Cavalry Action at. During the Gettysburg campaign General Stuart, commanding the Confederate cavalry, was ordered by General Lee to observe the movements of the Army of the Potomac and harass its rear should it attempt to follow the Confederate army and pass into Maryland. Leaving two brigades south of the Potomac, to guard the passes of the Blue Ridge, Stuart, with the rest of his command, crossed the Potomac at Seneca Creek, 20 miles north of Washington, on the night of 27 June 1863 and, learning that Hooker had crossed the river, marched north by way of Rockville, captured a train of 125 wagons and 400 prisoners between Rockville and Washington, struck the Baltimore and Ohio Railroad at Sykesville and Hood's Mills, and, ascertaining that the Union army was marching from Frederick northward, endeavored to get ahead of it, reaching Westminster at 5 P.M. of the 29th, where he struck a squadron of the First Delaware Cavalry, which offered a stubborn resistance, but was finally dispersed, and Stuart, continuing his march, bivouacked at Union Mills, about midway between Westminster and Littlestown. Hearing that Union cavalry was at Littlestown, and that Early was on the Susquehanna, he marched by crossroads for Hanover, on the morning of the 30th and, at 10 o'clock, his head of column reached that place, 16 miles east of Gettysburg, and attacked the rear and flank of Kilpatrick's cavalry division, as it was passing through the town from Frederick and Littlestown, in advance of Meade's central column. His first attack threw the rear of Farnsworth's brigade into confusion, but Farnsworth rallied his men, Custer's brigade was recalled and thrown into action and, after two hours' fighting in and around the town, Stuart was driven back on the Littlestown road, having lost nearly 100 men. Kilpatrick reports his own loss at 59 killed and wounded, and 123 missing.

Stuart was now in a perilous position; he had thrust himself unwittingly between Kilpatrick's cavalry and Meade's main body; Gregg's cavalry division was moving north on his right, but he extricated himself by marching all night over a circuitous route through Jefferson to join Early at York. The latter, however, was on his way to Gettysburg, and Stuart passed almost within sight of him, without knowing it. Finding that Early was not at York, Stuart continued his march to Carlisle, hoping to find Lee's main body there, but found the place occupied by Union troops, and heard that Lee was concentrating at Gettysburg, where by marching night and day, he joined him in the afternoon of 2 July. See GETTYSBURG, CAMPAIGN AND BATTLE OF.

HANOVER, Treaty of, an alliance between England, France and Prussia, made in September 1725, for the purpose of mutual assistance, in opposition to that between Austria and Spain.

HANOVER COLLEGE, at Hanover, Ind.; founded in 1827, under the auspices of the Presbyterian Church, as Hanover Academy. It was chartered as a college in 1833. Women have been admitted since 1880. The regular departments are letters, arts, science, law, philosophy and education. No charges are made for tuition. In 1916 the college reported 24 instructors, 304 students and about 25,000 volumes in the library. The endowment fund is over $300,000, and the annual income is about $20,000.

HANOVER COURT HOUSE, Engagement Near. On 21 May 1862 General McClellan had marched the Army of the Potomac up the York Peninsula to the banks of the Chickahominy, 7 to 12 miles distant from Richmond. On the 26th he heard that R. H. Anderson's Confederate brigade and Stuart's cavalry were near Fredericksburg, and that another body, Branch's brigade, was in the vicinity of Hanover Court House, 17 miles north of Richmond, to his right and rear. These bodies threatened his communications, and were in position to reinforce Jackson, in the Shenandoah Valley, or to oppose McDowell, whose advance was then eight miles south of Fredericksburg. Gen. Fitz-John Porter was ordered to clear the enemy from these positions and destroy the bridges over the South Anna and Pamunkey rivers. Warren's small brigade had been already detailed to destroy the bridges, had destroyed all means of communication over the Pamunkey as far as Hanover Court House, and was then posted at Old Church. On the morning of the 27th Warren moved toward the courthouse, on a road running parallel to the Pamunkey. Porter left New Bridge at 7 A.M. with Morell's division and Emory's cavalry brigade and, marching by way of Mechanicsville northward toward the courthouse, about noon his cavalry and the Twenty-fifth New York Infantry encountered a portion of Branch's brigade, supporting two pieces of artillery, attempting to hold the road leading to the courthouse. A Union battery was brought up and Butterfield's brigade deployed, which charged and drove the Confederates from the field, capturing one gun. A part of the Twenty-fifth New York was captured by the Confederates. Supposing that the Confederates had all retreated in the direction of Hanover Court House, Porter pursued, the cavalry, under Emory, and the Seventeenth New York, overtaking and capturing a large number of the Twenty-eighth North Carolina. Upon nearing the junction of the Ashland and the courthouse roads, a part of Martindale's brigade was sent toward Ashland to guard that flank against an approach from Richmond and to destroy the railroad running to that city. Near Peake's Station Martindale ran into Branch's brigade, was immediately attacked, and was driven back some distance. When Porter, whose advance had reached Hanover Court House, heard that Martindale had been attacked, he faced about his entire column, reached Martindale, struck Branch on his left and rear, and routed him. Branch retreated to Ashland and formed a junction with Anderson's brigade, which had fallen back from McDowell's front. After destroying the railroad in several places and opening the way for McDowell's advance from Fredericksburg, Porter returned to his old camps on the night of the 29th. The Union loss in the engagement of the 27th was 62 killed, 223 wounded and 70 missing. The Confederate loss was 73 killed, 192 wounded and 730 prisoners, of whom about 150 were also wounded. Consult 'Official Records' (Vol. XI); Webb, 'The Peninsula'; 'McClellan's Own Story'; Allan, 'The Army of Northern Virginia'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. II).

HANSA, or HANSE. See HANSEATIC LEAGUE.

HANSABUND (Ger. for "Hanseatic League," named in imitation of the famous mediæval organization of that name (q.v). A league of powerful German industrial and shipping magnates, created with the purpose of representing the interests of trade and industry. It was founded 12 June 1909 at Berlin at a meeting of the Central League of German Bankers and the Central League of German Industrials. One of its objects is the prevention of a one-sided preference for agrarian interests in the German national policy, which was evidenced in a number of declarations issued in the course of the war of 1914–18.

HANSEATIC (hăn-sē-at'ĭk) **LEAGUE, HANSA, or HANSE,** a confederacy of certain cities of northern Germany for mutual protection, especially in matters of commerce; for the extension of trade, and of rights and immunities received from sovereigns, and which had suffered curtailment. The union was formed in the 13th century, at a time when sea and land swarmed with pirates and robbers, and German trade, no longer guarded by the privileges of armed attendants, was exposed to many dangers, while the government had degenerated into a power for extorting taxes without giving protection.

The first alliances known to have been concluded are those between Hamburg and Lübeck (1241 and 1255) to keep open the road across Holstein connecting the North Sea with the Baltic, and between Lübeck, Rostock and Weimar in 1259 for defending themselves against the pirates. About the same time a similar league was concluded between the Westphalian towns, Münster, Dortmund, Soest and Lippstadt. When a wider union came to be formed for like purposes, the name of *Hansa,* signifying a league, which was at first applied to any such confederacy, survived exclusively as the name of that influential league. During its most flourishing period it embraced 90 towns, scattered over the whole length and breadth of Germany, including Holland. Its organization was very loose, the towns of which it was made up being at first divided into three and, after the 16th century, into four provinces, each with a chief town. These divisions had, however, little more than a geographical significance. The town of Lübeck, which already held an important rank, from the fact that it was the highest court of appeal for all those towns which were governed by the Lübeck law, was recognized as the chief town of the league. Here assembled the deputies of the other Hanse towns to deliberate on the affairs of the confederacy; the decrees of the Diet had no effect unless they received the sanction of the separate towns.

In the 14th century the league everywhere attained a high political importance, and gave rise to the development of that commercial policy which has since become intimately connected with all political relations, but of which the sovereigns of that time had little idea. Kings and princes were, in reality, more dependent on the league than it was on them. The extensive carrying trade of the Hanseatic League was a great source of wealth, and at length there was no mart in Europe which was not gradually drawn within the circle of its influence. England, Denmark and Flanders concluded treaties with the league for the extension of their commerce. It undertook to provide for the security of commerce on the Baltic and North seas. In the country under its immediate influence it constructed canals, and introduced a uniform system of weights and measures.

But the prosperity of the Hanse towns was naturally dependent on the continuance of the circumstances which gave rise to it, and when circumstances changed the league was destined to decline. When the routes by land and sea were no longer insecure; when princes learned the advantages of trade to their own states, and turned their attention to the formation of a naval force of their own, and the encouragement of navigation; when the inland members of the confederation perceived that the great seaport towns had a separate interest of their own, and used them principally to promote their own ends; then the dissolution of the Hanseatic League was evidently approaching. There remained at last as active members of it only Hamburg, Lüneburg, Lübeck and the towns in the neighborhood (Wismar, Rostock, Greifswald, Stralsund), whose interests were identified with those of Lübeck. The league existed no longer as a political power, but merely as a loose association of towns for commercial purposes.

In England, during the reign of Queen Elizabeth, the league lost its privileges by its refusal to grant complete reciprocity. About 1614 there remained only 14 towns which contributed to the support of the league and had a voice in the management of its affairs. These were Lübeck, Wismar, Rostock, Stralsund, Greifswald, Stettin, Danzig, Magdeburg, Brunswick, Hildesheim, Lüneburg, Hamburg, Bremen and Cologne. The Thirty Years' War, which destroyed the prosperity of the German towns generally, gave the death-blow to the league. At the diet of 1629 it was entrusted to the cities of Lübeck, Bremen and Hamburg to consult for its general interests, and in 1630 these towns concluded among themselves a closer union, which was renewed in 1641. After the Peace of Westphalia (1648) repeated but vain attempts were made to bring the league together again, and a last diet was held in 1669. Hamburg, Lübeck and Bremen still retain their independence, and now form separate constituents of the German Empire. Consult in English, Zimmern, 'The Hansa Towns' (1889); and in German, the exhaustive series of works published between 1872 and 1910.

HÄNSEL UND GRETEL, a fairy opera in three acts by Engelbert Humperdinck, libretto by A. Wette, first presented in Germany in 1893 and in New York on 8 Oct. 1895. The characters are — Peter, a poor broom-maker; Gertrude, his wife; Hänsel and Gretel, their children; the Witch, who eats children; Sandman, the Sleepy Fairy and Dewman, the Dawn Fairy, with other children, angels and peasants. Based on the *Babes in the Wood* story, the opera opens with the two children being sent into the woods for strawberries and losing their way. Sandman sings them to sleep and fairies and angels guard them. In the forest lives the old witch in a gingerbread house, into which she entices children and bakes them into gingerbread. On awakening, Hänsel and Gretel approach the magic house and are lured inside. Being bidden to enter the oven to see if the cakes are baked, Gretel asks the witch to show her how to get in. The Witch bends over the oven and Hansel and Gretel push her in and slam the door. She is burnt to ashes, the charm is broken and a long row of children stand revealed when the gingerbread crust falls off them.

HANSEN, hän'sĕn, **Gerhard Henrik Armauer,** distinguished Norwegian physician: b. Bergen, Norway, 1841; d. 1912. He was educated during boyhood in the cathedral schools of his native city, afterward entered upon the study of medicine and was eventually appointed resident physician in the Rigs Hospital of Christiania. He was afterward government medical officer for the Lofoten fisheries, but did not reach the field of his fame until he was appointed in 1868 to the post of assistant physician at the Bergen Leper Hospital, of which Danielsson was director. From this time forth he devoted himself to the study of leprosy, and following the lines laid down by Virchow, traveled from one to another university of Europe, continuing his investigations. On his return to Norway the Medical Society of Christiania voted a sum of money to pay the expenses of his further researches. He at last was enabled to demonstrate the fact that leprosy was contagious. Continuing his investigations he discovered at last the leprosy bacillus in unstained preparations. Later it was stained and became known as Hansen's bacillus (1873). He was not successful in employing the bacillus for purposes of inoculation with a preventive object; but on the basis of his contagion theory, legislation has been enabled to check to a considerable extent the spread of the disease throughout Norway and elsewhere. His excellent work received tardy but generous recognition at the International Leper Congress of 1909 at Bergen.

HANSEN, Niels Ebbesen, horticulturist and plant breeder: b. Ribe, Denmark, 4 Jan. 1866, and migrated with his parents to the United States in 1873. He graduated from the Iowa State College of Agriculture in 1887. He followed practical horticulture and nursery work from 1888 to 1891, when he was made assistant professor of horticulture in the Iowa State College, a position which he held until he was made professor of horticulture in the South Dakota Agricultural College, and horticulturist of the South Dakota Agricultural Experiment Station, in 1895. In 1894, he spent four months in studying horticulture in eight different European countries. In 1897–98, he spent 10 months in an agricultural and horticultural exploration of Russia, Siberia, Turkestan and western China, for the United States Department of Agriculture, during the course of which he collected many seeds and plants of economic importance for introduction into the United States. In 1906, he made a similar tour under the same auspices through parts of Lapland, Finland, Russia, Siberia, Manchuria and Japan, and again, in 1908–09, when he spent nine months in exploring Siberia, Mongolia, Turkestan, Transcaucasia and northern Africa. He is the originator of a number of varieties of new fruits, including several hybrid plums of unusual hardiness and excellence, and he is known as the introducer of the Turkestan and Siberian alfalfas, which endure the extremely low temperatures of the northern portions of the Great Plains region. In addition to writing numerous bulletins and papers on horticultural topics, he has published two books, namely, 'Handbook of Fruit-Culture and Tree-Planting' (in Danish Norwegian), 1890, and 'Systematic Pomology' (with Prof. J. L. Budd, 1903).

HANSOM, or HANSOM CAB. See CARRIAGE.

HANSON, Alexander Coutee, American journalist and politician: b. Maryland, 1786; d. 1819. After being graduated at Saint John's College, Annapolis, he adopted journalism as a profession, and in 1812 his office was wrecked by a mob on account of an article attacking the Madison administration which appeared in the *Federal Republican,* of which he was editor. He was elected to the lower house of Congress in 1813, and from 1817 until his death had a seat in the Senate.

HANUS, Paul Henry, American educator: b. Hermsdorf-unter-dem-Kynast, Prussia, 14 March 1855. He came to the United States in childhood, was educated at the University of Michigan, B. S., 1878 and has been professor of the history and art of teaching at Harvard from 1891. He was chairman of the Massachusetts State Commission on Industrial Education from 1906 to 1909. He has been a member of the State Board of Education since 1909. He is a trustee of Wellesley College, and chairman of the Boston vocation bureau (a philanthropy for studying and organizing vocational guidance). In 1911–12 he was director of the educational aspects of the school inquiry undertaken by the board of estimate and apportionment of the City of New York. He received the degree of LL.D. from the University of Colorado in 1906. He has published 'Elements of Determinants' (1886); 'Geometry in the Public School' (1893); 'Educational Aims and Educational Values' (1899); 'A Modern School' (1904); 'Beginnings in Industrial Education and Other Educational Discussions' (1908); 'School Efficiency' (1913); and editor of the School Efficiency Series (13 volumes). He is a contributor to educational and other periodicals.

HAPGOOD, Isabel Florence, American author and translator: b. Boston, Mass., 21 Nov. 1850. She has written 'The Epic Songs of Russia' (1886); 'Russian Rambles' (1895); 'A Survey of Russian Literature' (1902); 'A Service Book of the Holy Orthodox Catholic (Greco-Russian) Church' (1906), etc., and is widely known by her translations from the Russian of Tolstoy, Gogol, Sergyenko, Gorky, Turgenev, etc., and she has also made important translations from the French, Italian and Spanish.

HAPGOOD, Norman, American journalist: b. Chicago, 28 March 1868. He was graduated from Harvard in 1890, and the Harvard Law School in 1893, and has since become well known as a keen, discriminating essayist and dramatic critic. He has published 'Literary Statesmen and Others' (1897); 'Daniel Webster' (1899); 'Abraham Lincoln' (1899); 'The Stage in America' (1901); 'Industry and Progress' (1911).

HAPSBURG, hăps'bĕrg (Ger. häps'boorg) (properly HABSBURG), the imperial house of Austria-Hungary, so named from the ancestral castle in the canton of Aargau, Switzerland, on the right bank of the Aar. The castle was built in the 11th century by Bishop Werner, a descendant of Ethico I, a Count of Alemannia, in the 7th century. It stands on the Wüpelsberg, a steep rocky situation, whence the name *Habichtsburg* (Hawk's Castle). The proprietors of Hapsburg became at a later period counts of Hapsburg and gradually extended their territories. Werner II, who died in 1096, is said to have been the first to assume the title. After the death, about 1232, of Rudolph II, the fourth in succession from Werner II, the family divided into two branches, the founder of one of which was Albert IV, and that of the other Rudolph III. The latter is known as the Hapsburg-Lauffenburg line, which became extinct in the direct male line in 1408. A younger son of Rudolph, called Eberhard, founded the Kyburg branch of the Hapsburg-Lauffenburg line, which did not become extinct till 1415 and Godfrey, a grandson of Rudolph, who settled in England in the 13th century, there became the founder of the Fielding family, to which the Earls of Denbigh belong, and of which the novelist Fielding was a member. The line descended from Albert IV is that to which the historical celebrity of the house is almost entirely due. In 1273 Rudolph, the son of Albert IV, was chosen emperor of Germany or Holy Roman emperor. He is the founder of the reigning house of Austria, which is of the line of Hapsburg-Lorraine. From Rudolph to Charles VI the Austrian monarchs were of the Hapsburg male line. Maria Theresa, who succeeded Charles VI, married Francis Stephen of Lorraine, who in 1745 was chosen emperor of Germany. Francis II the third emperor of Germany of the line of Hapsburg-Lorraine, was the last who bore that title till the establishment of the new empire, the last of the so-called «Holy Roman Emperors.» He changed it in 1806 for that of emperor of Austria, and the present imperial house of Austria continues to represent that line. From the Emperor Rudolph was also descended a Spanish dynasty which began with the Emperor Charles V (Charles I of Spain), and terminated with Charles II in 1700. Consult Steed, H. W., 'The Hapsburg Monarchy' (1913).

HARADA TASUKU, hah-rah'-dah tah'-soo-koo, Japanese editor, educator, Congregational pastor and preacher, and president of the Doshisha (one endeavor) University of Kioto, Japan: b. November 1863 at Kumamoto. After study in his native city, the Theological School in Kioto and Yale Divinity School, traveled in Europe in 1891 and 1910; president of the Christian Endeavor Union of Japan 1893–1906; special lecturer in English in India under the auspices of the Y. M. C. A.; inaugurated president of the Doshisha 1907; lectured at Yale and in Hartford Theological Seminary, 1909. Received degrees LL.D. from Edinburgh University, and D.D. from Amherst College. Pastor in Tokio, Kioto and Kobe. Author of works in Japanese, and 'The Faith of Japan,' New York 1914.

HARAFORAS, or **ALFURESE,** names applied in Celebes, the Moluccas, Mindinao, and the adjacent islands to certain native tribes, particularly of the interior, which differ from the Malays, and have been thought to be perhaps pre-Malayan aborigines.

HARAKIRI, hăr'ạ-kĭr'ē, or **SEPPUKU,** a mode of inflicting death upon themselves formerly permissible in Japan to criminals of the Samurai or two-sworded class as more honorable than public execution. It consists in cutting open the body so as to disembowel it, by means of a wound made with one sword perpendicularly down the front and another with the other sword horizontally. Till recent times Japanese of the two-sworded class who had been guilty of any crime frequently resorted to this mode of killing themselves before their guilt had been proved, and it was regarded as honorable in them to do so, indicating a strong sense of shame. Sometimes they were commanded to put themselves to death in this manner. The system became obsolete before the middle of the 19th century; but examples still occur as expressions of loyalty, as the suicide of General Nogi and his wife on the death of the late emperor; and of the choice of death rather than capture, as in the committing of harakiri by the officers of a Japanese troopship at Vladivostock during the Russo-Japanese War. Consult Mitford, 'Tales of Old Japan' (3d ed., 1876); Chamberlain, 'Things Japanese' (1891), and Longford, 'Evolution of New Japan' (1913).

HARALD. See HAROLD.

HARAN (Assyrian *Kharranu*, road), the name of a district of northern Mesopotamia and of a town situated therein, on the stream called Jullab, southeast of Edessa. The name is probably derived from the fact that at this town the trade-routes from Media, Assyria and Babylonia met to proceed along the same highway to the coast of Cilicia. Haran is mentioned in the Old Testament in Gen. xi, 31–32, and Ezekiel xxvii, 23. To the Assyrians it was a strategic post of great importance. In the inscriptions references to it appear as early as the reign of Tiglath-pileser I (about 1100 B.C.). An extensive commerce centred here. To the Greeks and Romans it was known as Carræ (Gk. *κάρραι* or *χάρα*). Crassus, the Roman commander, was here defeated and slain by the Parthians during his Eastern expedition (53 B.C.), and Caracalla assassinated by the soldiery of Macrinus (217 A.D.). It was of importance even in the time of Arab supremacy, but the geographer and historian Abulfeda (d. 1331) speaks of it as in ruins in his day. It was the seat of an episcopal see in the 4th century. It gave its name to a semi-pagan sect, of obscure origin and tenets, known as the Harranians, located there in the 9th century. Consult Metz, 'Geschichte der Stadt Harran' (1892).

HARAR, or ADARI, a Semitic dialect spoken in the Abyssinian province of Harar (q.v.). It includes some Hamitic words. For an account of it, consult an article by Prätorius in the 'Zeitschrift der Deutschen Morgenländischen Gesellschaft,' Vol. XXIII (1869).

HARAR, HARRAR, or ADARI, capital of the province of Harar in eastern Abyssinia, south of the Gulf of Aden, about 180 miles from the coast, with which it has rail connection. It is situated at an elevation of 5,500 feet above the level of the sea. The surrounding district is very fertile and produces chiefly coffee. Cotton is also a large crop, and excellent in quality. There is a brisk trade in gum, ivory and fruits. Harar was formerly the capital of a small, independent country, ruled by an emir. In 1876 it became a dependency of Egypt, and later was under Italian protectorate. After the Italian defeat at Adowa in 1896, it passed with the province to Abyssinia. Its first European visitor was Sir Richard F. Burton, who obtained admission there as an Arab in 1855, and described it in his 'First Footsteps in East Africa, or An Exploration of Harar' (1856). Pop. about 50,000. Consult further the 'Bulletin de l'Etat Major-Général de l'Armeé Egyptienne' (1876); and Paulitschke, 'Harar: Forschungsreise nach den Somal- und Gallaländern' (1888).

HARAR, HARRARI, or HARRUR, the most easterly of the Abyssinian provinces; bounded on the east and north by British and French Somaliland, and on the south and southeast by British East Africa and Italian Somaliland. The country is a table-land, with a maximum elevation of nearly 11,000 feet. Previous to the insurrection of the Mad Mullah (q.v.) it was a part of the Egyptian Sudan. It was captured by Italy in 1891, but after the severe defeat of the Italian forces by the Abyssinians at Adowa 1 March 1896 it passed to Abyssinia. The foreign trade of Abyssinia is conducted largely through Harar.

HARAUCOURT, Edmond, French poet and novelist: b. Bourmont (Haute-Marne), 18 Oct. 1857. His first work appeared in 1883 and was entitled 'La légende des sexes, poèms hysteriques.' A collection of his verses was published in 1891. He also published 'Amis' (1887); 'Shylock' (1889); 'Don Juan' (1898); 'Jean Bart' (1900); 'Les Benoit' (1905); 'La Peur' (1907); 'Trumaille et Pelisson' (1908).

HARBAUGH, Henry, American clergyman of the German Reformed Church in America: b. near Waynesborough, Pa., 28 Oct. 1817; d. Mercersburg, Pa., 28 Dec. 1867. He studied at Franklin and Marshall College (Mercersburg) and at the Mercersburg Seminary, was ordained in 1843, and in 1843-64 held pastorates successively at Lewisburg, Lancaster and Lebanon, Pa. In 1864 he was appointed professor of theology in the Mercersburg Seminary. He was one of the leading exponents of the "Mercersburg theology" (q.v.), and belonged to the high-church school of his denomination. From 1850 to 1866 he was editor of the *Guardian*, and in 1866-67 of the Mercersburg *Review*. Besides a collection of poems in the "Pennsylvania Dutch" dialect, he published 'Heaven' (1848); a 'Life of Michael Schlatter' (1857); 'Christological Theology' (1864), and other works.

HARBEN, William Nathaniel, American novelist: b. Dalton, Ga., 5 July 1858. He was on the editorial staff of *The Youth's Companion*, 1891-93. He left college before finishing his education and went into the mercantile business in the South for himself. He remained in the business till 1888 when he gave it up to follow literature as a profession. Under the advice of Mr. W. D. Howells he has confined his literary studies chiefly to Georgian character and scene for the last 15 years. He is a member of the Authors Club of New York, and of the National Institute of Arts and Letters. He has contributed many short stories to magazines and his published novels are 'White Marie' (1889); 'Almost Persuaded' (1890); 'A Mute Confessor' (1892); 'The Land of the Changing Sun' (1894); 'From Clue to Climax' (1896); 'The Caruthers Affair' (1898); 'The North Walk Mystery' (1899); 'Northern Georgia Sketches' (1900); 'The Woman Who Trusted' (1901); 'Westerfelt' (1901); 'Abner Daniel' (1902); 'The Substitute' (1903); 'The Georgians' (1904); 'Pole Baker' (1905); 'Ann Boyd' (1906); 'Mam' Lindy' (1907); 'Gilbert Neal' (1908); 'The Redemption of Kenneth Galt' (1909); 'Dixie Hart' (1910); 'Jane Dawson' (1911); 'Paul Rundel' (1912); 'The Desired Woman' (1913); 'The New Clarion' (1914); 'The 'The Triumph' (1917); 'The Hills of Refuge' (1918).

HARBIN, Manchuria, a city on the Sungari River at the point where the Manchurian branch of the Trans-Siberian Railway crosses that stream. The Chinese eastern branch of the railway, running to Dalny (Talienwan) (q.v.) and Port Arthur (q.v.), begins here. Prior to the Russian occupation in 1900 (see MANCHURIA), Harbin was a small Chinese village. On account of its geographical and strategical position it was chosen as a military centre, and very quickly it became also headquarters for railway and governmental affairs. Commerce and manufacture have also greatly developed, although not originally considered in the promotion of Harbin; and here more than elsewhere Russia gradually asserted its intention of becoming an active industrial force in the Orient. Every system of protection that could be devised has been employed by the government to advance its commercial prestige. Harbin consists of the old town, three miles distant from the central depot; Prestin, the river town, the present commercial portion; and the administration town, about the railway. Only Russian and Chinese are allowed to hold land, construct buildings or enter any permanent enterprise. The territory for many miles surrounding has been secured so as to make it impossible for any foreign interest or influence to obtain a foothold or profit near to the city. The principal railway engineer is the chief administrative official. A census of 1903 showed a population of 60,000 exclusive of soldiery; of these all but 700 were Russians. The imports into Harbin in 1914 were valued at $13,447,458 and in 1915 at $9,410,725. The total exports in the same years amounted to $9,831,460 and $5,598,457, respectively. Coal and coke, fruit and vegetables, clothing materials, boots and shoes, oils, tobacco and railway supplies form the bulk of the imports. Live stock, beans, grain, eggs, fish and fishery products, ground nuts, meats and hides are the chief articles of export. Harbin has 19 steam-power bean-oil mills, two sugar refineries and large timber and coal interests. There are four distilleries and a candle factory. About 4,952 vessels of 1,508,179 tons entered and cleared the harbor in 1915, exclusive of 15,735 Chinese junks of 259,339 tons.

HARBOR GRACE, Newfoundland, a port of entry on Conception Bay, 27 miles west by north of Saint John's, 84 miles by rail. It has a large but exposed harbor, with an inner secure port and a patent slip. It is the see of a Roman Catholic diocese with a handsome cathedral and convent. Its commerce is second to that of Saint John's. Pop. 4,279.

HARBOR SEAL, or **HAIR-SEAL,** the common small seal (*Phoca vitulina*), once common on both sides of the North Atlantic down to Virginia in the United States, but now only occasionally seen south of Cape Cod. They are still numerous in the Saint Lawrence. See SEAL.

HARBOR SPRINGS, Mich., village, county-seat of Emmet County, on Little Traverse Bay, an arm of Lake Michigan, and on the Grand Rapids and Illinois Railroad. The landlocked harbor is much used by lumber vessels. The village is in a part of the State where the large forests make lumbering the chief industry. The chief manufactures are flour and lumber. The cool climate in summer makes Harbor Springs a favorite resort during July and August. The electric lighting and waterworks are municipally owned. Pop. 1,805.

HARBORS, DOCKS AND BREAKWATERS. The principal purpose of a commercial harbor is to furnish a means for transferring freight from the interior to seagoing carriers. The harbor affording the cheapest and most expeditious shipping facilities attracts the greatest patronage, as it is the facility for readily discharging cargoes and reloading, rather than the size of the harbor, that attracts shipowners. By the erection of a breakwater, the dredging of a creek or river and the construction of modern docks provided with railroad tracks leading to the water edge and equipped with the latest facilities and mechanisms for loading and unloading, one city gains an advantage over another that has a better natural harbor, wherein however a modern system has not been installed.

The world's largest cities are primarily those that have important water communication, and, while this feature is generally viewed as merely an adjunct to a city's commerce, it is in reality of prime importance to its progress. Those cities that neglect their waterways fall behind in growth and prestige, while those that improve their harbor facilities usually forge ahead with rapid strides. The question of harbor improvements is therefore a vital one and deserves the most careful consideration of those in authority, and the support of every class of citizens. Cities that have natural advantages must keep their equipment up to date, while those with limited natural facilities may overcome their disadvantages, and, by well-planned improvements, rise to positions of international fame — as many European cities have done in recent years — entering into successful competition with older and better known ports.

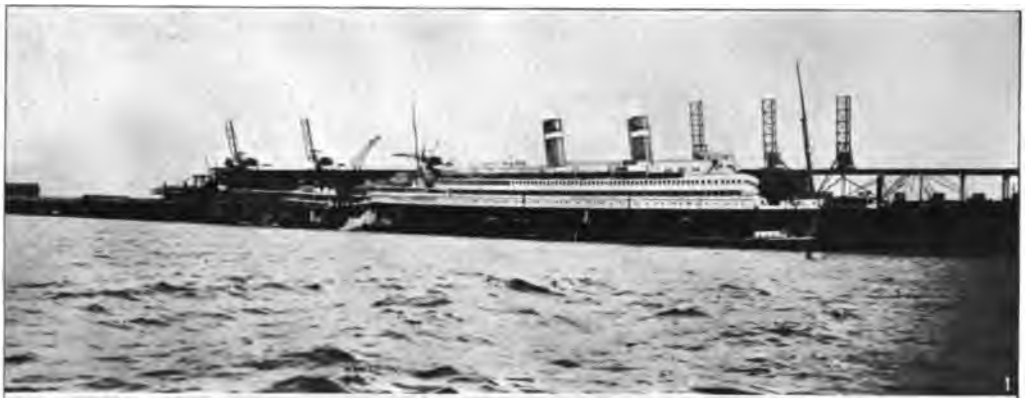
In the making of improvements the true purposes and reasons for harbors should be kept in view — whether for commercial, refuge or fishery purposes, or a combination of any two, or all. To be successful, the improvements planned should be considered not alone from an engineering but from every other standpoint.

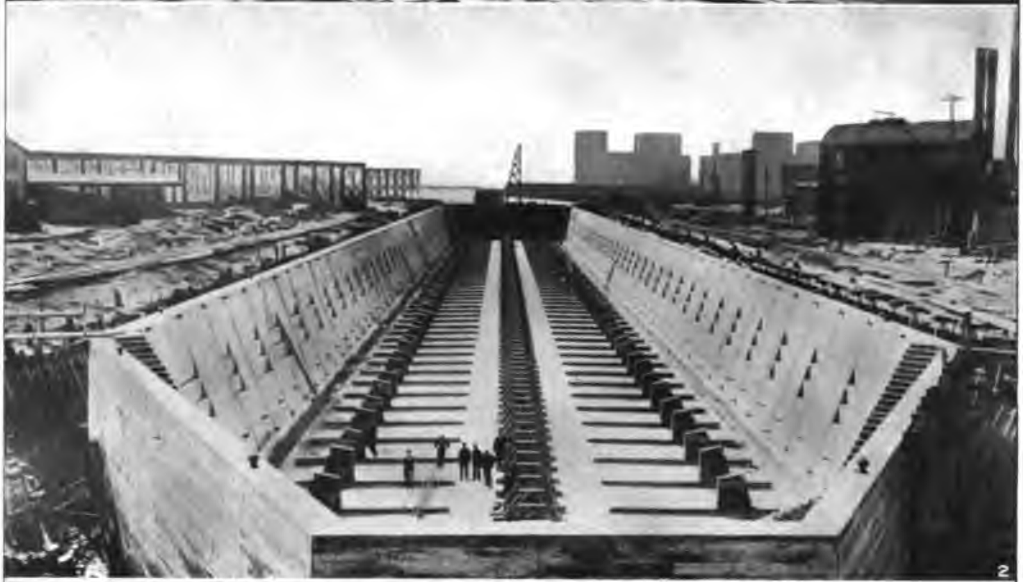
The elements of the commerce of an inland city consists of freight handled by inland carriers — such as railroads, river steamers, canal boats and other forms of transportation — as likewise coastwise and overseas freight, in addition to the products of its own industries. The incoming freight is destined for four principal purposes: immediate transshipment, storage for later shipment, material for the city's industries or wares for local consumption. The facilities of the city should, therefore, be planned to the end that the freight for each of these purposes shall be handled in a different manner. Freight for immediate transshipment, transferring from cars to vessels or vice-versa, should be handled on piers equipped with railroad tracks and loading and unloading devices, so that cargoes may be transferred with as little intervention of manual labor as possible, and in a minimum of time. Such piers need not be in close proximity to the business district of the city; any point in the harbor that may readily be reached by a railroad will answer the purpose. A ship that receives part of its cargo from railroad cars may also, at the same time, take on freight from a canal boat, the transshipping piers — when placed near canal and railroad freight terminals — being thus enabled to serve a double purpose.

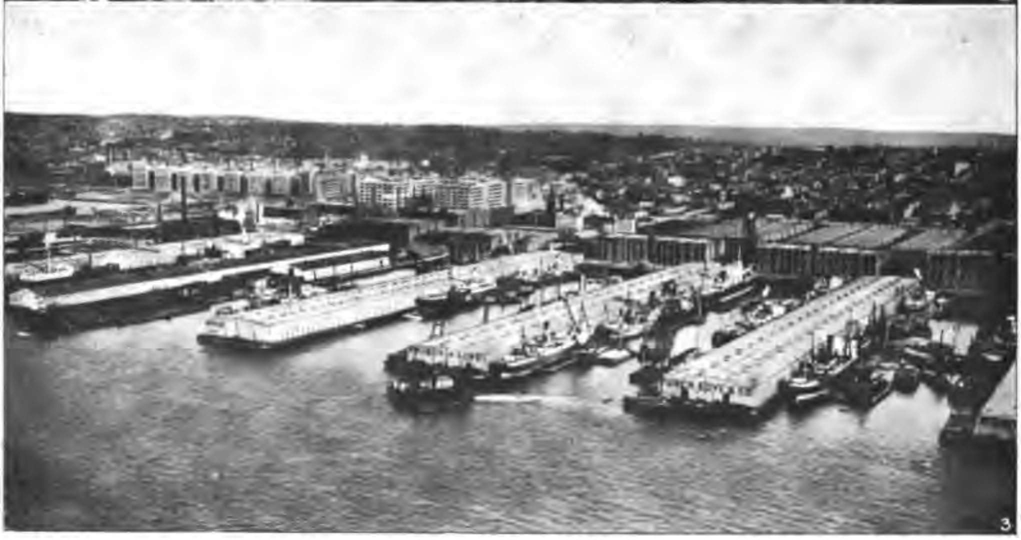
Freight intended to be stored in the city for future shipment should be placed in elevators or storage warehouses accessible to both rail and water transportation, but preferably away from the business district of the city. Particular care should be taken to avoid the placing of terminals and storage warehouses in such location as to necessitate the trucking of freight across the city.

Freight intended as material for manufacture in the factories of the city should, whenever possible, be delivered by rail or water direct, and the finished product should be removed in the same manner. The advantages of rail connections are appreciated by manufacturers who, wherever possible, have a spur or switch extended into their yards. The value of canals, however, is not so well understood, although a system of canals proves of

HARBORS AND DOCKS

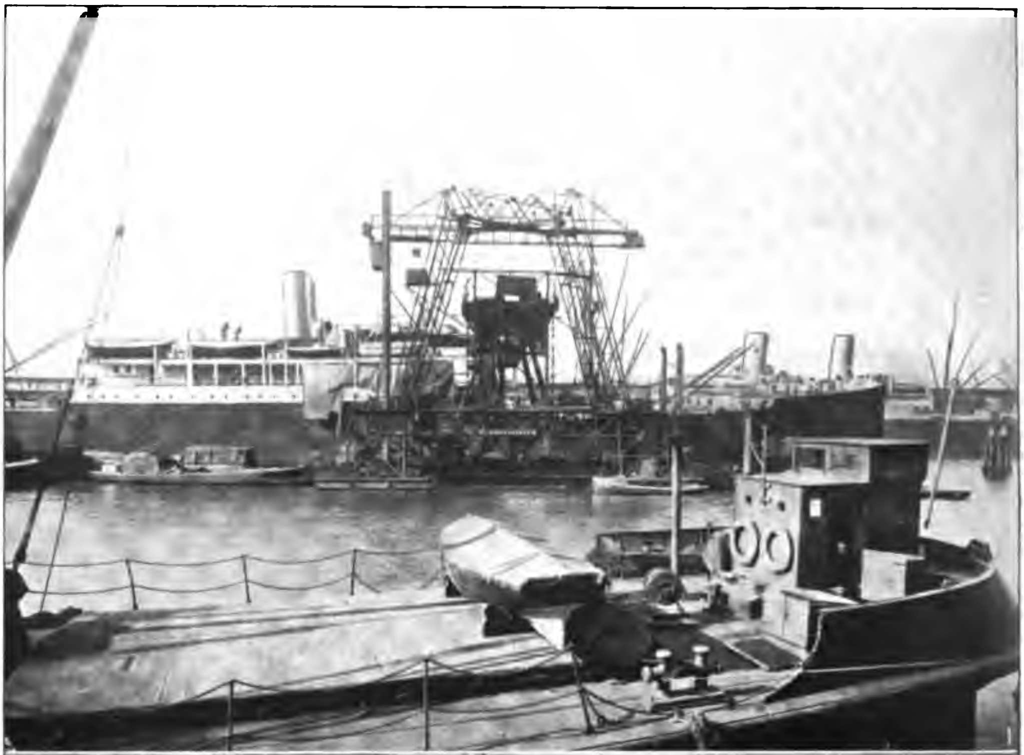






1 Harbor at Rotterdam, Holland, showing Dock and Machinery for coaling sea-going vessels
2 Concrete Dry Dock 3 Docks, Storehouses and Manufacturing Buildings, Bush Terminal, Brooklyn, New York

HARBORS AND DOCKS



HARBOR OF HAMBURG, GERMANY

1 Electric Operated Elevator for coaling ocean-going vessels

2 Dock and Fairway with mooring posts

the greatest utility in a manufacturing district, particularly for products of a bulky nature.

Freight intended for local consumption should be distributed to the various points of destination in the most direct manner possible. The principle to be followed in handling the freight of a city is to effect final delivery, as nearly as possible, without breaking bulk and with the least expenditure of time and labor. The use of the truck is an expensive method and a public nuisance, and should be avoided or minimized.

Seaports, as well as inland harbors, may greatly increase their commerce by improving their harbor facilities. For example, Frankfort-on-the-Main borrowed $18,000,000, of which $6,000,000 was spent in acquiring land and $12,000,000 in the making of improvements. An area of 110 acres was excavated and a very prosperous river port was thus created. The increased earnings from these improvements enabled the city to liquidate this debt in a few years. The river traffic, encouraged by the harbor improvements, served to develop new industries; 720 acres were reserved for factory sites that were disposed of at a profit; the city now derives large revenues from the undertaking, while the industry, commerce and prosperity of the community has been increased.

The port of Hamburg, which is 65 miles from the sea, is almost entirely a constructed port. Sixty years ago the channel of the Elbe had a depth of but 15 feet at high tide; to-day, as a result of continuous dredging, it has a depth of about 40 feet. The harbor is a great network of piers, basins and channels, dredged out of the lowlands, but affording unlimited docking facilities. In equipment and convenience, this harbor is the equal of any in the world, and the sum of $150,000,000 approximately has been spent in its development.

In addition to the harbor at Hamburg, two other ports — among the greatest on the continent — those of Antwerp and Rotterdam, are largely of an artificial nature. In fact, although Rotterdam is a very ancient city, it never became of commercial consequence until it developed its harbor.

The importance of harbor facilities in England was early realized in the construction of a number of ports having extensive improvements, although London, its most important city, has contented itself with existing conditions, and consequently has not advanced in comparison with certain other cities less favorably situated. Liverpool has spent $200,000,000, Manchester and Newcastle, $85,000,000, and Glasgow, $44,000,000. Manchester, in order to free herself from Liverpool tolls, built a canal 35 miles long, and from 290 to 370 feet wide at the top, and from 120 to 170 feet wide at the bottom, and 25 feet deep. This improvement, which was completed in 1893, furnished an outlet to the sea and added enormously to the city's commercial importance.

An American city that has profited greatly by harbor improvements is Buffalo, which had in fact, no harbor at all. But the erection of a breakwater, however, has overcome its natural disadvantages, and it is now, in point of tonnage, the 10th port of the world. Boston, on the other hand, with a splendid natural harbor, has failed to extend its facilities, and the increase in the size of vessels has been such that many cannot now enter this port — a condition that could have been avoided had Boston deepened her channels. Another city, Baltimore, since the big fire, has spent $6,500,000 on dock and pier improvements, which has assisted materially in maintaining her maritime trade.

The Pacific coast ports are showing considerable activity in the development of harbor facilities. Los Angeles, by a consolidation with Wilmington and San Pedro, will have a shore front 22½ miles long. The city has spent $3,000,000, and the three boroughs, during the next 10 years, will spend $1,000,000 per year on harbor improvements. The State of California is spending $10,000,000 on the extension of the State-owned docks at San Francisco, and Oakland is spending $3,500,000 on strictly municipal docks. The State will also spend $1,500,000 for State-owned docks at San Diego. This activity in the improvement of Pacific coast harbors has been mainly influenced by the opening of the Panama Canal (q.v.) which will prove an important factor in the development of the Western States, and, in fact, the entire country.

Notable among New York's harbor improvements are the Chelsea Docks, while another dock of 1,000 feet in length is at present under construction. An interesting feature in the harbor facilities of this city is the Bush Terminal System, consisting of seven piers, each 1,400 feet in length. These piers are equipped with railroad tracks leading from the piers to a series of 125 warehouses and a dozen reinforced concrete factory buildings of immense size, housing some 275 different manufacturing concerns. The system includes also a spacious yard with 25 miles of tracks, capable of accommodating 1,000 railroad cars, and a number of locomotives, floats, lighters and tow-boats. The economy and convenience in thus being able to quickly load and unload cars and vessels may be readily realized.

As has been indicated, in harbor improvements, one of the chief features is to arrange the docks so that railroad cars may be run alongside the vessels, permitting freight to be quickly transferred. This is best accomplished by the modern form of cranes, and great economies are effected when such apparatus is properly designed. In certain harbors the engineering arrangements are such that vessels may be loaded from two or three tracks simultaneously, and two or three cranes may take cargo from one hatchway without interfering with each other. The very latest and best machinery, however, should be adopted, as great advances have recently been made in this field, and the difference between modern and antiquated equipment will be of appreciable importance in the commerce of the port.

Hamburg — where advantage has been taken of the latest developments in harbor engineering — has thus a great advantage over New York, where very few piers are laid with tracks, and where not a single pier is equipped with loading and unloading cranes, and the truckman — in all his glory — charges for small lots as much in many cases as the amount charged for long railroad hauls.

In 1911 Hamburg possessed 130,000 lineal feet of quays for ocean liners, more than

5,000,000 square feet of sheds, and 805 cranes for loading and unloading ocean and river vessels. The docks of Hamburg vary in length from 2,500 to 3,500 feet in length and traveling cranes are run on both sides of the piers. Some five or six ocean-going steamers can lay alongside each of these docks. The fairway between the docks is some 750 feet in width, so that, between the rows of ships on either side of the docks, a row of ships may be made fast to the mooring post in the middle of the fairway, discharging cargoes into lighters, for which purpose floating cranes are at hand. One of the principal piers has a length of some 5,000 feet, thus showing what modern engineering has accomplished in the way of harbor improvements under conditions that at the outset were most unfavorable.

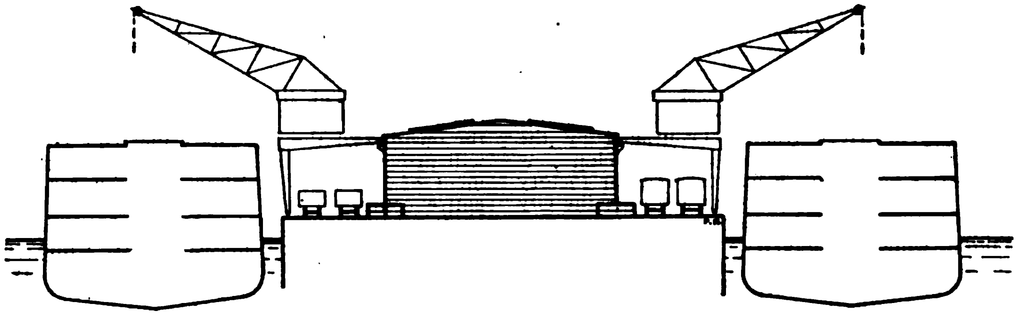


FIG. 1.—Shows a typical arrangement for unloading machinery, such as is installed on the new docks at Hamburg, Bremen and many other European harbors.

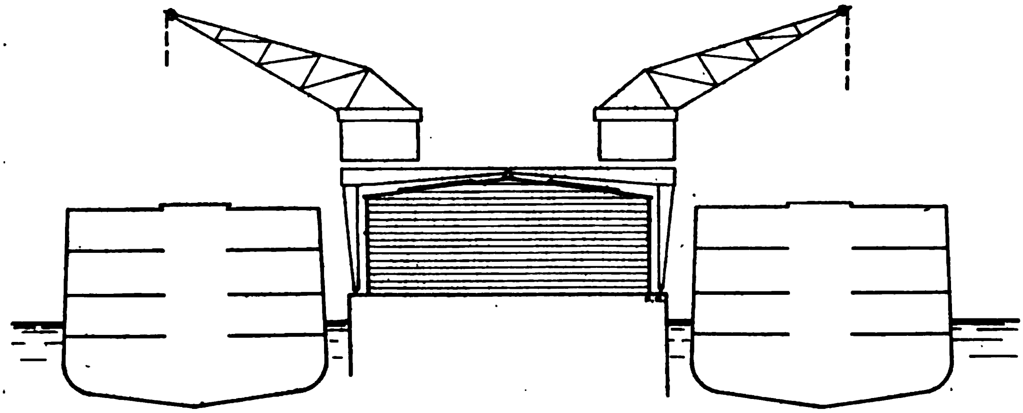


FIG. 2.—Illustrates the arrangement for unloading machinery, as installed in connection with existing docks in several Continental and South American harbors. It will be noticed that in Fig. 1 the cranes overspan the railroad tracks at the sides of the dock-superstructure, while in Fig. 2 the cranes overspan the dock-superstructure itself.

In 1912 the port of Hamburg cleared in imports and exports 25,000,000 tons, valued at over $2,000,000,000. The tonnage was 2,000,000 in excess of 1911. The three ports of London cleared in exports and imports $150,000,000 less than Hamburg. One of the reasons for Hamburg's predominance is that it is a free port, goods being warehoused without customs duties being levied.

DOCKS.

Prominent harbors are equipped with dry-docks or basins for the purpose of making external repairs of ships. These dry-docks are owned by shipbuilding companies, as they must necessarily be associated with such establishments as can furnish skilled workmen and the requisite materials and machinery for doing the work. The dry-docks or basins are provided with gates for the ingress and egress of vessels, and, after the vessel is lodged within and properly supported, all water is drained out, presenting the entire contour of the ship for inspection and repairs.

There are two types of dry-docks — floating and stationary. The former is made of steel or wood, and is designed to permit of being towed from harbor to harbor. The latter, as a rule, is excavated into the shore, after which the floor is laid and the three walls erected of either wood construction or masonry — brick, granite or concrete. Heavy masonry walls, however, are the most popular, as they are better adapted for withstanding the inward pressure of the earth filling.

In the following are given data concerning some of America's foremost dry-docks. The most important governmental navy yard is located at Brooklyn, N. Y., where the largest ships can be built and entirely overhauled. Here are four dry-docks: two of wood construction, measuring 491 and 658.9 feet over all in length, respectively, and two of granite, 302.2 feet and 571 feet in length. The yard is well equipped with every class of modern machinery. In addition to this, several important private shipbuilding and repairing companies having stationary and floating docks are located on the littoral of New York city, both on the North and the East rivers.

The governmental navy yard in Massachusetts Bay at Boston has, besides an old granite dry-dock, built in 1827, a modern concrete dock of 750 feet in length with 30 feet of water on the sills. Another system is that of Philadelphia, where there are several navy shipyards having notable dock facilities. An early constructed dry-dock at the League Island navy yard is 491 feet long and has 25.5 feet of water on the sill. A later dry-dock built of concrete and granite has an overall length of 739.5 feet and 30 feet of water on the sill. The Cramp shipyard, known the world over as the place where the greatest number of United States battleships have been built, has some of the most notable dry-docks, both of timber and concrete construction, and is well equipped for the construction and repair of ships. Across the river, at Camden, is located the immense plant of the New York Shipbuilding Company, equipped with strictly modern facilities for the construction and repair of vessels of any size.

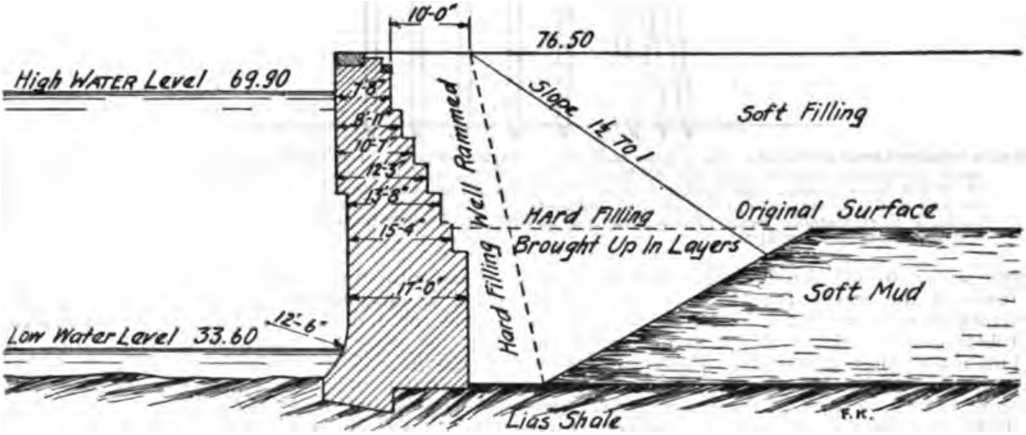


FIG. 3.—Shows a cross-section of the dock and basin walls at Barry, Wales. This was built of large blocks of mountain limestone, faced with hard red sandstone, and later the walls were backed with various layers of hard and soft fillings, as indicated in the drawing.

At Newport News, Va., is located the Newport News Shipbuilding and Dry Dock Company. The facilities of this concern are such that it is able to undertake the construction or repair of any class of ship, mercantile or naval. Among its equipment are two Simpson dry-docks, 610 and 827 feet in length, capable of docking vessels up to 64 feet beam.

The United States Naval Station at Algiers, in the vicinity of New Orleans, possesses a steel floating dock of 525 feet in length, there being in addition at New Orleans under private ownership two floating docks of 200 feet and 300 feet in length, respectively. These two floating docks may be used together, giving a length, on the keel blocks, of 487 feet.

On the Pacific Coast there is the California Dry Dock Company, at San Francisco, having a masonry dock of 490 feet in length, and a depth of water 23 feet above the sill. The Union Iron Works in the same city has a steel hydraulic lift with a capacity of 4,750 tons, and a length of 446 feet, with two other large graving docks, one 420 feet long, with 28 feet of water on the sill, and the other 700 feet long, with 30 feet of water on the sill. The naval station of California is situated at Mare Island. It possesses two docks, the one being 510.5 feet in length, and the other 739.5 feet. The former is of granite, while the latter is of granite and concrete. Another dry-dock is that of the Puget Sound Naval Station, Port Orchard, Washington. This is a timber-constructed dock of 460 feet in length, with 30 feet of water on the sill.

There are of course a large number of shipbuilding concerns on inland waterways that possess divers kinds of docking facilities for ships. For instance: the Buffalo Dry Dock Company is equipped to build ships of from 4,000 to 5,000 tons. It has four docks with overall length of 305 feet, 358 feet, 381 feet and 478 feet, respectively, while the widths at the top are 38 feet, 43 feet, 45 feet and 84 feet, respectively. The depth of the water corresponding above the still is 11, 14, 12.5 and 60 feet.

As a rule most harbors are unsightly in appearance. However, within the past generation many cities, to overcome this unsightliness, have spent large sums of money to beautify or improve the general appearance of their harbor approaches by the construction of quay walls, sea gates, recreation piers and parking.

BREAKWATERS.

The most important work and the most fundamental feature in connection with artificial sheltering or refuge harbors and roadsteads is the *breakwater* intended, as its name indicates, to break up and disperse heavy seas, thereby preventing the destruction of beaches and harbors and ensuring a haven for seacraft. They must be of great strength and stability.

When we realize that the force of the waves is beyond calculation, and that it is impossible to say what will be their size and pressure at a given time or location — it being known that those produced by great storms attain a height of 30 feet, with a pressure per square foot of from 6,000 to 7,000 pounds — we shall then comprehend the need of breakwaters, as likewise the difficulties in their construction. Some are constructed of timber, secured or anchored in sections, with openings permitting the water to go through, thus breaking the force of the wave. But the more usual construction is to build the breakwater solidly of rubble, of concrete, of stone or of some combination of these materials. The most feasible method is by the use of rubble, or irregular stone, which is sunk in the water and adjusts itself through the action of the waves. Constant additions bring its mass to or above the surface, when its sloping sides are capped with solid masonry so adapted as to best resist the play of the waves.

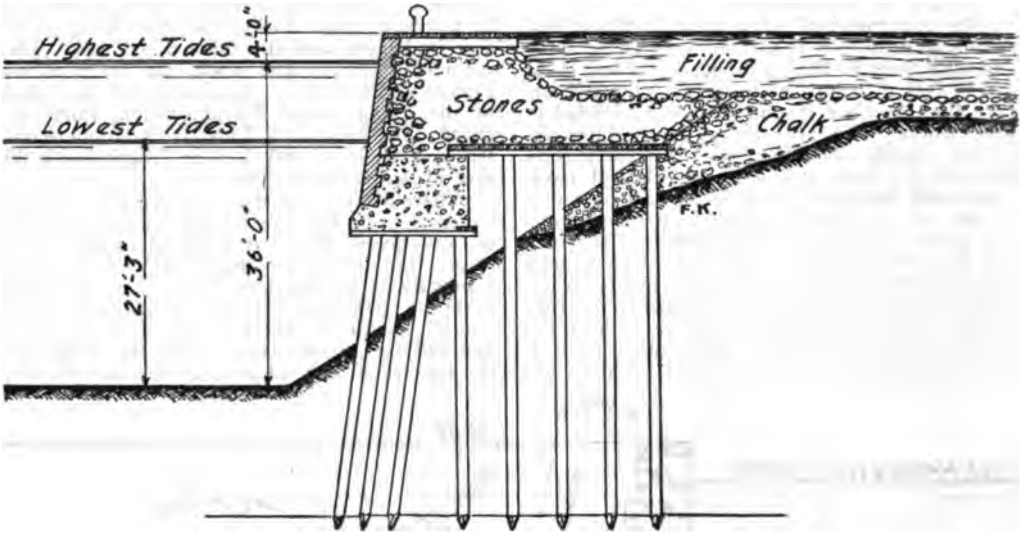


Fig. 4.—Shows a cross section of a typical quay wall, that of Rouen, France. The lower section of the quay wall was built inside watertight caissons with removable sides. It was sunk on top of wooden foundation piles which were cut off 25 feet below coping. The wall is designed to support a load of five tons per square foot. The lower section of the wall is of concrete, the upper of rubble masonry faced with brick. Tie tods connect the quay wall with anchor blocks a short distance away. For a distance of 200 feet the back of the wall is filled in. The cost of this construction per lineal foot was $180.

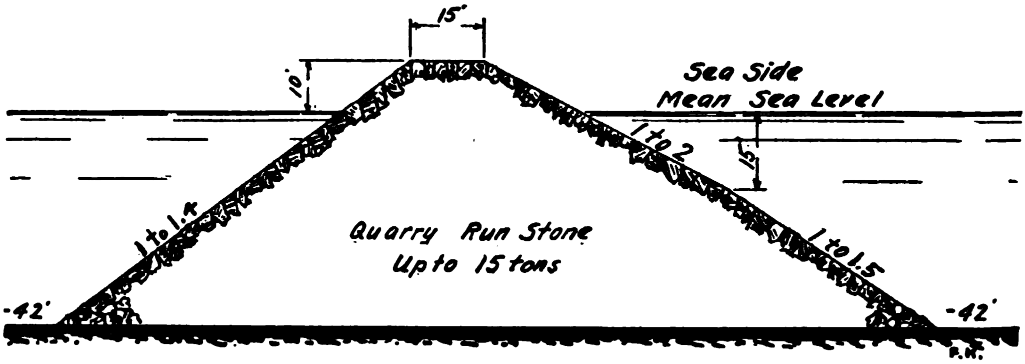


Fig. 5.— Shows a cross section of a breakwater at Colon, Panama. It is 11,322 feet long, and was constructed at a cost per lineal foot of $500. The entire construction is of quarry-run stone varying in weight up to 115 tons each. The weight is 340 tons per lineal foot.

It has been found that the solid masonry constructed type of breakwater, of which the most notable example is to be found at Cherbourg, France, receives the force of the waves without diverting it, with the ever-constant possibility of giving away. To avoid this danger, the modern engineer has endeavored to so construct that there will be no direct force. The best practice to-day involves making or finding a rock support for a mass of rubble, so constituted that when one stone washes away another slips into its place. The face of the rubble mound is inclined to the end of diverting the waves to one side or cause them to spend their force upward. A concrete covering of the rubble mass may be formed by anchoring metal piles through the rubble and throwing in concrete in bags.

While breakwaters generally run at a slight angle practically parallel to the shore, there is another type of the same known as training jetties that extend at right angles with the shore. An excellent example of this latter is the series of jetties at Lido outlet channel. The length of the northeast jetty is 11,926 feet, while the southwest jetty is 10,551 feet in length. The distance between the outer paral-

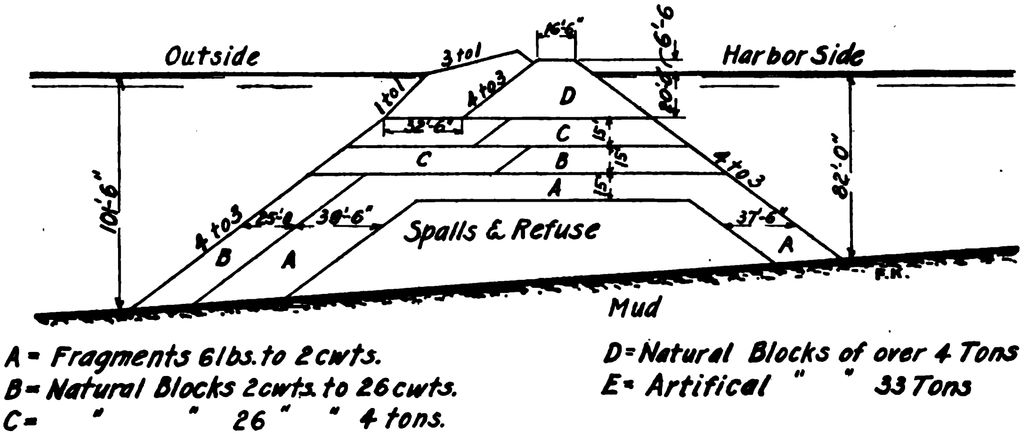


FIG. 6.— Shows the breakwater at Marseilles, France, which is constructed of spalls and refuse, while the upper and outer layers are of natural and artificial blocks varying in weight up to 33 tons each. This breakwater was constructed at a cost of $615 per lineal foot.

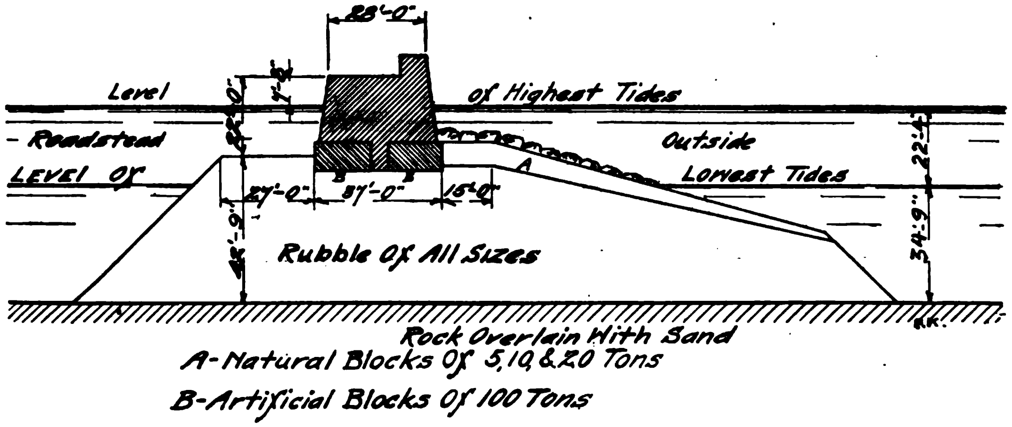


FIG. 7.— Shows another typical breakwater, that of Cherbourg, France. It is 3,750 feet in length and was built at a cost per lineal foot of $435. This breakwater is constructed of rubble and natural and artificial stone blocks weighing up to 100 tons each.

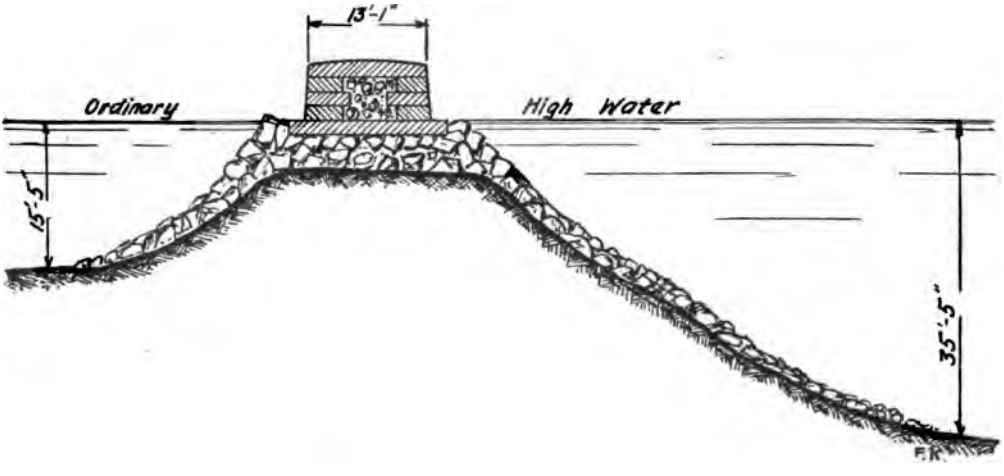


FIG. 8.— Malamocco Jetty, Venice, Italy.

lel sections is 2,970 feet. These jetties are very similar in construction to the Malamocco jetties at Venice, shown in Fig. 8. These last consist of two jetties, also, the northern one having a length of 6,962 feet, and the southern 3,137 feet. The distance between them is 1,545 feet. The bases are of rubble. The width at the top is 28 feet. The superstructure — 6 feet 6 inches high and 13 feet 1 inch wide — is built up of masonry with an inner core of rubble. The Malamocco jetties cost approximately $1,600,000, and their yearly maintenance amounts to $3,200. The average velocity of the ebb current at ordinary tide through the channel is two feet per second.

In the waters of the United States are many breakwaters — certain of them evidencing the highest form of engineering skill. They are the result of modern commercial necessity that is being recognized more day by day. Perhaps the most important is that of Buffalo (Fig. 9) — a city whose natural harbor was comparatively insignificant — completed in 1903. With a geographical and waterway situation through which centred the great commerce between the East and the West, Buffalo was without adequate facilities for handling the freight and cargoes of the great trunk lines and the Great Lakes shipping, but through engineering, by her great system of breakwaters, has overcome this disadvantage, and, as has been noted elsewhere in this chapter, stands tenth as regards tonnage handled among the world's ports.

Prior to 1903 there already existed two breakwaters at the port of Buffalo — one, the «north» breakwater, of concrete, 2,200 feet in length, with a light at its southerly end; and the other, or «old» breakwater, extending parallel, with a light at its northerly end opposite to the light mentioned on the north breakwater. The length of the old breakwater is 7,608 feet. Between the two lights is the harbor entrance. The new breakwater, or that of 1903, is located south of the old breakwater, being of concrete construction for 7,261 feet, and connecting with a timber and concrete construction of 2,739 feet, having a light at its southerly end. Parallel and to the west is a timber crib breakwater, 2,803 feet in length, with a light at its northerly end, the opening between this and the new breakwater forming a «South» harbor entrance, while the opening between the stone breakwater and the old breakwater is known as the «middle» harbor entrance. The longer extension of the new breakwater is of the rubble, stone-capped type, while the shorter extension is of timber crib construction for the purpose of allowing vessels to moor alongside of it in the harbor. The new breakwater is located in the open waters of Lake Erie, parallel with the shore, 1,500 feet from the pierhead line, and in 30 feet of water; its construction occupied six or seven years, at a cost of $2,200,000.

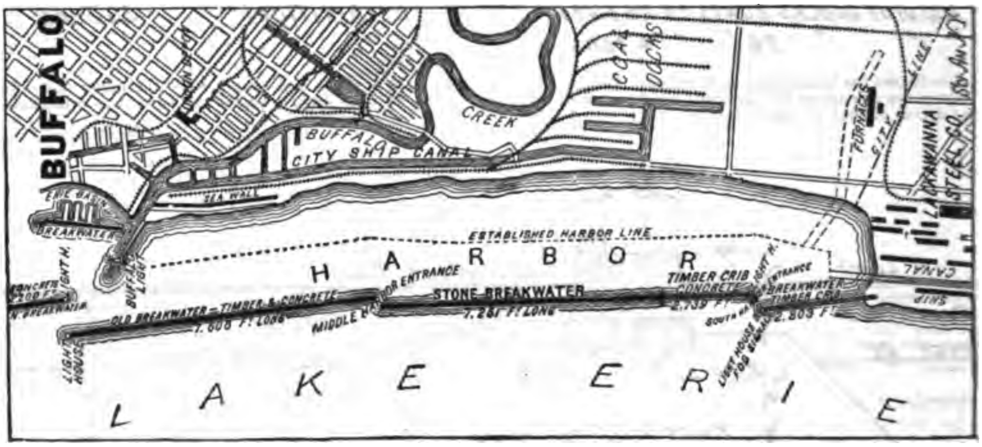


Fig. 9.— Breakwater at Buffalo, N. Y.

In the following table are given additional dimensions and most typical modern breakwaters.

Location	Length, feet	Height	Base	Cost
Plymouth, England	5,100	55	380	$7,500,000
Portland, England.	6,400	73	345	4,192,000
Alexandria, Egypt.	9,675	40	100	10,000,000
Cherbourg, France.	12,178	73	320	13,372,000
Holyhead, England	7,860	72	408	6,425,000
San Pedro, Cal....	8,500	62	180	2,900,000
Sandy Bay, Mass..	9,200	72	205	6,828,000

FRANK KOESTER,
Consulting Engineer, New York.

HARBY, Levi Charles, American naval officer; b. Georgetown, S. C., 21 Sept. 1793; d. Galveston, Tex., 3 Dec. 1870. While a midshipman in the United States navy in 1812, he was taken prisoner and confined in Dartmoor Prison, England, until the end of the war. He served under General Jackson in the Creek war, and participated in the Texas struggle for independence and the conflict with Mexico. Subsequently he fought in South America under Bolivar. On the secession of South Carolina, he resigned his commission in the United States service and joined the Confederate forces as commander of the fleet at Sabine Pass.

HARCOURT, här'koort, Sir **William George Granville Venables Vernon,** English statesman: b. York, 14 Oct. 1827; d. Nuneham, Oxfordshire, 1 Oct. 1904. He was the second son of the Rev. William Vernon Harcourt, canon of York, and was graduated at Trinity College, Cambridge, with high honors in 1851, receiving the degree of M.A. He then studied law, being called to the bar in 1854, and in 1866 he became queen's counsel. In 1859 he stood for the Kirkcaldy Burghs as an Independent Liberal, but was narrowly defeated. During these years he wrote largely for the *Saturday Review* and other journals, and in 1861 began to attract attention by a series of letters on international law and kindred subjects contributed to *The Times* over the signature of «Historicus.» These were continued intermittently till 1876. In the early years he dealt with the problems arising out of the American Civil War. His aim was to deny belligerent rights to the Confederates, and he strongly influenced public opinion in favor of the North. A series of these letters was published under the title «American Neutrality.» In 1868 he entered Parliament as Liberal member for Oxford, serving his constituents till 1880, when he was defeated for re-election. He was, however, selected to represent Derby and continued in that position until 1895, when, having been defeated at the general election, he found a seat in West Monmouthshire. In 1869 he was elected Whewell professor of international law at Cambridge. He was appointed solicitor-general in 1873, but held the office only three months, and in the same year was knighted by the queen. Although he had not supported Mr. Gladstone during his retirement from power, yet upon that statesman's return to the office of Prime Minister in 1880, he was appointed Secretary of State for the home department, continuing in that capacity until the Liberal party went out of power in 1885. During this Parliament his name became famous through his connection with the Ground Game Act (1880), the Arms (Ireland) Act (1881), and the Explosives Act (1883), the last one being pushed through all its stages in the shortest time on record. He was also conspicuous for his attacks on the Nationalist leaders; but on the conversion of Gladstone to Home Rule he followed his leader in yielding to the Irish demands. In 1884 his bill for unifying the municipal administration of London was introduced. Upon the return of the Liberals to power in 1886 he was made Chancellor of the Exchequer, holding that position only a short time as the fortunes of politics again took him from office. He offered strenuous opposition to the cession of Heligoland to Germany. Again in 1892 he was made Chancellor of the Exchequer, acting as such until 1895. It was during this term, in 1894, that he introduced and carried his famous budget, in which the income tax became more graduated and the «death duties» on real and personal property were equalized, and imposed on an ascending scale. Upon Gladstone's retirement in 1894, Harcourt was looked upon as his successor, but Queen Victoria on her own initiative sent for Lord Rosebery and asked him to form a government. Sir William then became leader of the Liberals in the House of Commons, and it became evident that he and the new Prime Minister did not agree as to party policy, and, though their differences were from time to time patched up, it was clear in his defeat at Derby in 1895 that the party was divided on many issues, and the effect was then seen of Sir William's Local Veto Bill, not only in the utter rout of the Liberals, but in the setback given to temperance legislation. From 1895 to 1900 he represented West Monmouthshire in the House of Commons, but the task of leadership of the Liberal party became particularly onerous because of the tendency of the various sections to break away from control. In the session of 1896, against the overwhelming Unionist majority, he scored several successes, but was severely criticised by his own party for concurring in the majority report of the special committee, of which he was a member, appointed in 1897 to investigate the Jamieson Raid and the British South Africa Company. The internal dissensions in the Cabinet became more marked as time went on, and the divided counsels manifest among the leaders of the Liberals led to his decision to retire from the leadership of the party on the floor of the House of Commons, and in 1898 with John Morley he retired from active work and thereafter sat as a private member. As a private member, he no longer restrained his attacks on the government, paying not the least deference to Liberal imperialism. He actively opposed the government's policy with regard to the sinking fund, their attitude in the negotiations with the Transvaal, and the financing of the South African War, and throughout the war he lost no opportunity in criticising the South African developments. In 1898–1900 he became prominent, both on the platform and in his letters to *The Times*, in advocating active measures against ritualistc practices in the Church of England. The general election of 1900 found him full of fight, favoring the official Liberal program as distinct from that of the imperialist section which favored the return of Lord Rosebery to the leadership. In his last years he opposed with characteristic energy Chamberlain's tariff reform proposals. Sir William was a Liberal after the type of Cobden and Gladstone, and viewed with intense dislike the policy of expansion and imperialistic adventure that became popular with an influential section of his party in his late years. He was great as a parliamentary gladiator. Though his speeches were in the main carefully prepared and delivered from copious notes in reply he was very effective, a hard hitter, who was always brimful of witty and telling phrases, and on occasion, the master of a prose style at once flexible and sinuous. Sir William Harcourt married in 1859 Lady Thérèse Lewis, widow of Sir George Cornwall Lewis, and daughter of T. H. Lister, and again in 1876 Mrs. Elizabeth Ives, widow of J. P. Ives, and daughter of John Lothrop Motley, the historian, and at one time United States Minister in London. His son Lewis by his first wife was Colonial Secretary in the Asquith Cabinet, 1910–15, Commissioner of Works in the coalition ministry 1915–16, and was raised to the peerage on the accession of Lloyd George to power in December 1916.

HARD LABOR, in law, compulsory work, mechanical or other, sometimes judicially imposed upon criminals in addition to imprisonment or other punishment. It is a provision of statute law both in this country and Great Britain. Its first English adoption was secured through the demand for some adequate penalty in cases where penal servitude and transportation were for any reason inexpedient. In the United States the punishment of hard labor (which, however, is generally looked upon by humanitarians and sanitarians as being rather a healthful and merciful privilege) can only be imposed by a court on the authority of statute, the mode of applying the punishment being in some cases prescribed by State or Federal laws, and in others left to prison regulation.

HARDECANUTE, hăr-dė-kạ-nūt′, **HARDICANUTE** or **HARDY CANUTE**, king of England and Denmark; son of Canute the Great (q.v.): b. about 1017; d. 8 June 1042. At the time of his father's death in 1035 he was in Denmark, where he was immediately recognized as king. His half-brother, Harold, however, who happened to be in England at the time, laid claim to the throne of that part of their father's dominions. For a time the mother of Hardecanute succeeded in holding Wessex in his name, while Mercia and Northumbria were held by Harold, such an allotment having been made by a witenagemote held at Oxford. Hardecanute was about to make an armed descent upon England, when Harold died (1040), and his brother peacefully succeeded him. He reigned till 1042, but his reign was not marked by any important event. He left the government almost entirely in the hands of his mother and the powerful Earl Godwin (q.v.), while he gave himself up to feasts and carousals.

HARDEE, William Joseph, military officer: b. Savannah, Ga., 10 Oct. 1815; d. Wytheville, Va., 6 Nov. 1873. He was graduated at West Point in 1838; served with distinction in the Mexican War; and in the Civil War entered the Confederate army with the rank of colonel. He commanded a corps at Shiloh; and was promoted lieutenant-general in 1862. At Perryville he commanded the left wing of the Confederate army, and in December 1864 defended Savannah against General Sherman

HARDEN, Maximilian (Felix Ernst), German publicist: b. Berlin, 20 Oct. 1861. He was the son of a Jewish merchant named Witkowski, and was educated at the French Gymnasium, at Berlin. He first attracted attention by essays of a literary character, published in the periodicals *Die Nation, Gegenwart, Frankfurter Zeitung,* and still more by those of a political and social character, written for the *Gegenwart* under the pseudonym of «Apostata.» In October 1892, Harden founded *Die Zukunft,* a weekly periodical, which was successful from the beginning. Harden succeeds in assuming, on most public questions, an attitude of isolation, intensified by a lack of consideration for other persons, and strengthened by a wide and aptly-applied erudition, together with unusual powers of formulation. The latter are sometimes handicapped by more or less obscure allusions, particularly to persons and incidents in those portions of the Old Testament that are less widely read. Harden has frequently taken positions that were unpopular; he undertook to champion Bismarck after the latter's dismissal by William II; he criticized Caprivi severely when he was Chancellor, and his attacks on the social evils of Berlin were charged as muckraking. In 1890 he was sentenced to six months' captivity in a fortress for *lèse majesté.* He acquired a universal reputation by his attacks, in 1907, on Prince Philip von Eulenburg and other friends of Emperor William II, all of whom he accused of abnormal and perverse tendencies, and of the perpetration of immoral acts. Chiefly, however, he objected to their forming a sort of camarilla around the emperor and isolating him from the nation. He maintained that they prevented the emperor, in 1905 and 1906, from assuming a more vigorous policy in the dispute then in progress between his country and France and England over the Morocco question, and that they influenced him to make concessions to France that were injurious to the national dignity and the vital interests of the German Empire. The scandal Harden thus called forth resulted in the exposure of certain immoral practices by several persons of the imperial court, and in the disgrace of a number of intimate personal friends of the emperor. One of the latter, Aide-de-Camp General Count Kuno von Moltke took legal action against Harden. After a sensational trial, the latter was acquitted by a lower court at Berlin. But the incident had aroused so much interest through its revelations, that the Socialists began to use it as material for their attacks on the government of William II. Accordingly, the imperial prosecutor for Berlin himself inaugurated proceedings against Harden before the Court of Correction, and, after a trial conducted chiefly behind closed doors, obtained a sentence against Harden of four months' imprisonment for defamation of character. Most of the witnesses who had inculpated von Moltke in the first trial withdrew or altered their testimony in the second, in order to obviate a scandal, in accordance with an understanding with the authorities. It was later maintained that Harden had simply been the tool of Holstein (q.v.) and other members of the anti-French party in the Moroccan affair.

After the outbreak of the European War, Harden and his weekly *Die Zukunft* continued to assume a consistently critical character, repeatedly championing the actions of Germany's opponents to the detriment of the German government. Especially after the entrance of the United States into the war, Harden often called attention to the idealistic motives of the American government and people, designating the American nation as a «great storehouse of idealism,» and assuring German bureaucracy, that it was guilty of a serious error in underestimating the naval and military powers of the new enemy. Frequently his expressions in this connection caused a suppression of the offending numbers of the *Zukunft;* thus, the number of 24 Aug. 1918 was suppressed because it contained an article by Harden on the expulsion of Count Lichnowsky (q.v.) from the Prussian upper house, for having written the so-called «Lichnowsky Memoir.» In general, Harden wrote, in these attacks on the Prussian government and on German imperialism, from the standpoint of the Liberal Democrat, who wished to see, a businesslike, efficient, but not monarchic or bureaucratic, régime established in Germany. To this extent he may be considered a national reformer, but not a revolutionist. His attitude toward the Russian Revolution, after the November 1917 *coup d'état,* was that of bitter hostility. His published works are ‘Apostata’ (2 vols. of essays, Berlin 1892); ‘Theater und Literatur’ (essays, Berlin 1896); ‘Kampfgenosse Sudermann’ (Berlin 1903); ‘Köpfe’ (2 vols. of character studies, including one on Rockefeller, Berlin 1910–11; 2d ed., 1912); ‘Prozesse’ (“Famous Trials,” essays, Berlin 1913). Consult autobiographical sketch in *Zukunft* (10 Oct. 1903); Bahr, Hermann, ‘Maximilian Harden’ (in *Neues Wiener Tageblatt*, 13 Nov. 1904).

Jacob Wittmer Hartmann,
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HARDEN, William, American historian: b. Savannah, Ga., 11 Nov. 1844. He left his studies in the schools of Savannah to join the Confederate army, serving throughout the Civil War in the 54th Georgia infantry and in the signal corps. After the war he studied law and was admitted to the bar in 1873. He was assistant librarian of the Georgia Historical Society from 1866 to 1869, when on 5 August he was appointed librarian, a position he still occupies. He has been librarian of the Savannah public library from its beginning in 1903. He has been a member of the board of managers of Telfair Academy of Arts and Sciences since 1882, and custodian since 1894; organizer and secretary of the Georgia Society of the Sons of the Revolution since 1891; and was a Democratic member of the Georgia house of representatives from 1900–04. Has written much on historical subjects in magazines and journals and has published ‘A History of Savannah and South Georgia’ (1913).

HARDEN-HICKEY, James Aloysius, American writer and adventurer: b. San Francisco, 1854; d. El Paso, Tex., 10 Feb. 1898. According to some accounts he was born in France and descended from an old Catholic Royalist family of Irish origin, whose ancestors had emigrated to France with the Stuarts. He received his education at the Jesuit College of Namur, Belgium, the French Military Academy of Saint Cyr, and at Leipzig. In Paris (1878) he founded *Le Triboulet*, a satirical journal that frequently brought him into collision with prominent people and the authorities owing to his violent attacks against the Republican government. After passing through a number of libel actions — for which he had to pay dearly — and fighting a series of duels, Harden-Hickey was expelled from France in 1880 by decree of the Minister of the Interior. He had adopted or inherited — it is not clear which — the title of “baron,” and was celebrated as a skilful fencer. About 1889, while making a trip round the world in a sailing vessel, he touched at the island of Trinidad, a desolate, uninhabited little rock in the South Atlantic, 700 miles from Rio de Janeiro. Returning to the United States, he married a daughter of John H. Flagler, the Standard Oil magnate, in 1891. In 1894 he set into operation a scheme to found a principality on Trinidad, and adopted the title of “James I, Prince of Trinidad.” In January 1895, however, a British warship called at the island and reannexed it to the British Empire, to which it had once belonged. Protestations raised by the Brazilian government led to the island being handed over to Brazil in 1896. Harden-Hickey met his death by an overdose of a drug with — it is supposed — suicidal intention. He was an accomplished linguist and wrote most of his works in French, among them being ‘Sampiers’; ‘Mémoires d'un gommeux’; ‘Près du gouffre’; ‘Un Amour Vendéen’; ‘Aventures merveilleuses de Nabuchodonosor Nosebreaker’; ‘Bernard de Ventador’; and ‘Euthanasia,’ an essay on suicide. See Trinidad, or Ascenão.

HARDENBERG, Friedrich Leopold, Freiherr von, better known as “Novalis” (*Latin*, new land, from the name of a family estate), German author and hymnologist: b. Oberwiederstedt, Prussian Saxony, 2 May 1772; d. Weissenfels, 25 March 1801. With the Schlegels and Tieck, he was one of the founders of the German Romantic School, of which his hymns and fragmentary novels are characteristic products. Idealistic, and based on distinctive views of philosophy, mathematics, art and the sciences they contain a singular mixture of imagination, sensibility, religion and mysticism, tinged by gentle and amiable enthusiasm. But due to his early death from consumption, they do not form a compact philosophy of life. The best of his hymns ‘Though all to Thee were faithless,’ ‘If only He is mine’ and ‘Hymn to Night’ are beautiful, breathing a feeling of isolation and melancholy as to the ultimate attainment of actual good in the world, which was caused, doubtless, by the death of his betrothed, Sophie von Kühn in 1797, and by his state of health which prevented the consummation of a second engagement in marriage. This is perhaps best exemplified in ‘Die Lehrlinge zu Sais’ in which immortalizing as the “Meister” Werner, his instructor in geology at Freiburg, he theorizes the secret of life as “the fulfilled longing of a loving heart.” The best of his prose writings which Carlyle recommended for “perusal and reperusal” is the unfinished novel ‘Heinrich von Ofterdingen’ in which the quest of the “blue flower,” the symbol of Romanticism, is a poetical allegory marked by excellent narrative, interspersed with beautiful verse. Hardenberg's parents were Moravians, which probably accounted for his mystic religious tendencies. At Jena, Leipzig, Wittenberg and Tennstädt he was thoroughly grounded in mathematics, natural science, philosophy and law, and became distinguished for his poetical talents. Becoming auditor of the government salt-works in Weissenfels of which his father was director, he later studied geology at the mining academy of Freiberg, Saxony. He was appointed “Amtshauptmann” magistrate in Thuringia in 1800, but death the following year ended a career full of high promise. His works, collected by the Schlegels, were issued in two volumes, and several times re-edited, appeared with a third volume in 1846. Recent editions are Meisner, C., and Wille, B., (1898); Heilbron, E., (3 vols., 1901); Minor, J., (3 vols., Jena 1907); Boelsche (4 vols., Leipzig 1908); Schmidt, J., ‘Heinrich von Ofterdingen’ (published separately 1876); Raich, J. M., ‘Novalis' Correspondence’ (1880). Consult Carlyle, T., ‘Novalis’ (in ‘Critical and Miscellaneous Essays,’ Edinburgh ed., New York 1903); Maeterlinck, M., ‘Novalis’ (in ‘On Emerson and Other Essays,’ New York 1912); Haym, R., ‘Friedrich von Hardenberg’ (2d ed., Gotha 1883); Busse, C., ‘Novalis’ Lyrik’ (1898); Bing, J., ‘Friedrich von Hardenberg’ (Berlin 1901); Heilbron, E., ‘Novalis der Romantiker’ (Berlin 1901); Huch, R., ‘Die Romantik’ (4th ed., Leipzig 1911).

HARDENBERG, här'dĕn-bėrk, **Karl August,** Prince, Prussian diplomat and Chancellor: b. Essenrode, Hanover, 31 May 1750; d. Genoa, Italy, 26 Nov. 1822. To his efforts with those of Baron Stein, Prussia owes her wide-spread plan of social and political reorganization, the reform of the military system, the overthrow of so-called feudalistic rights, the uplift of the peasantry, the spread of education and the opening of the civil service to all classes. He had studied at Leipzig and Göttingen, acquired early knowledge of political government at Regensburg, Vienna and Berlin, and traveled in France, Holland and England. He married the Countess Reventlow; in 1778 became privy councillor; and went to England, where his wife's intrigue with the Prince of Wales marred his career, and caused his resignation from the Hanoverian service. From 1782–87 he served the Duke of Brunswick, becoming president of the council of state; in 1790 was appointed to administer the margravate of Ansbach and Bayreuth, and the following year when it was incorporated with Prussia, King Frederick II made him Minister of State and Cabinet member. During the Napoleonic wars he was prominent in the management of public affairs; in 1804 became first Prussian Minister, and incurred the displeasure of Napoleon who insisted on his dismissal in the Treaty of Tilsit. In 1810, however, after the resignation of Stein, he was appointed Prussian Chancellor, and began that series of reforms with which his name is inseparably linked in Prussian history by the War of Liberation. He was a signatory to the first peace of Paris, 30 May 1814, and received the title of prince, 3 June 1814. He visited England with the allied sovereigns and was the chief representative of Prussia at the Congress of Vienna 1814–15, where, however, he was not equal to the diplomacy of Metternich and, weakening to reactionary measures, sank in public favor. In 1822 he went to Italy to attend the Congress of Verona and shortly after its close died suddenly at Genoa. Withheld for half a century, his ‘Memoirs, 1801–07’ were edited by Ranke and published with a biographical introduction. Consult Ranke, L. von, ‘Denwürdigkeiten des Fürsten von Hardenberg’ (5 vols., Leipzig 1877); Klose, ‘Leben Karl Augusts, Fürsten von Hardenberg’ (Halle 1807); Meier, E., ‘Die Reform der Verwaltungsorganisation unter Stein und Hardenberg’ (Leipzig 1881); Meyer, C., ‘Hardenberg und seine Verwaltung der Fürstentümer Ansbach und Bayreuth’ (Breslau 1892); Koser, ‘Die Neuordnung des preussischen archivwesens durch die Staatskanzler Fürsten v. Hardenberg’ (Leipzig 1904); Seeley, J. R., ‘Life and Times of Stein’ (London 1879).

HARDHACK, or STEEPLE-BUSH, an erect species of American *Spiræa* (*S. tomentosa*), common in pastures and low grounds, and celebrated for its astringent properties, which cause it to be used medicinally. It is distinguishable by the dense woolly tomentum, which covers its stem and the underside of its leaves; and bears in late summer “a compact, steeple-shaped panicle of peach-blow pink.”

HARDIE, James Allen, American soldier: b. New York, 5 May 1823; d. Washington, D. C., 14 Dec. 1876. He was graduated from the United States Military Academy in 1843, entered the artillery, during the Civil War served on the staffs successively of Generals McClellan and Burnside, was judge-advocate-general of the Army of the Potomac on Hooker's staff, became brigadier-general of volunteers in 1862, and inspector-general with rank of colonel in 1864. He was brevetted major-general, United States army, in 1865 His writings are largely confined to military reports.

HARDIE, James Keir, British politician and labor leader: b. Scotland, 1856; d. Glasgow, 26 Sept. 1915. He worked in a coal mine as a boy till 1880, when he was elected secretary of the Lanarkshire Miners' Union. From that period he devoted himself to political and labor agitation. Entirely self-educated, he possessed a ready flow of language — not infrequently of the violent demagogue type. He made his first attempt for Parliament as a Labor candidate in 1888, but was defeated. In 1892 he was returned for West Ham, and made his first arrival at the House in circumstances which led to police intervention. He lost his seat in 1895, but returned in 1900 for Merthyr Tydvil, which he represented (with another member) till his death. He was one of the founders of the Independent Labor Party in 1892, of which he was chairman for many years. He was proprietor and editor of *The Labor Leader* from 1887 to 1903. In 1906, when the Labor party became a distinct group in the House, he was elected its first chairman. He visited India in 1907 and created considerable disturbance with his inflammatory speeches. Hardie traveled the British colonies and the United States on lecturing tours. He was the most extreme of British politicians; his gloomy views on the state of society placed him among a minority during most of his stormy political life. Though his socialistic principles never found much sympathy even among his own following, he performed valuable service to the cause of labor.

HARDIE, Robert Gordon, American portrait painter: b. Brattleboro, Vt., 29 March 1854; d. Brattleboro, Vt., 9 Jan. 1904. He studied drawing at the Cooper Union Institute, the Academy of Designs and the Art Students' League, N. Y., and at Paris became a pupil of Gérôme. He exhibited at the Salon in 1880 and following years, and in 1882 studied under Cabanel. A picture of his appeared at the Exhibition of the National Academy of Design in 1888, and he exhibited a portrait of his wife at the World's Columbian Exposition in 1893.

HARDING, Chester, American portrait painter: b. Conway, Mass., 1 Sept. 1792; d. Boston, 1 April 1866. As an artist he was self-taught, his trade being that of a turner. He fought as a soldier in the War of 1812, and found employment on his discharge as a sign-painter in Pittsburgh, Pa. Crossing the ocean he became a favorite portrait painter in London and found patronage among the royal family.

His ‹Portrait of Daniel Webster› is owned by the New York Bar Association, while his ‹Portrait of John Randolph› is in the Corcoran Gallery, Washington.

HARDING, Warren G., American statesman: b. Corsica, Morrow County, Ohio, 2 Nov. 1865. He studied at Ohio Central College, Iberia, in 1879–82; and since 1884 has been engaged in the newspaper business at Marion, Ohio, as president of the Harding Publishing Company, publishers of the *Star*. In 1900–04 Mr. Harding was a member of the Ohio senate and from 1904 to 1906 was lieutenant-governor. In 1910 he was Republican nominee for governor of Ohio, but failed of election. Subsequently he was elected to the United States Senate for the term 1915–21. Harding has been compared to McKinley as a harmonizer in his own party. In the Senate his course has been that of a «regular,» though not that of a narrow party man. Mr. Harding is spoken of as the strongest candidate of the Republican party for the Presidency.

HARDNESS, Scale of. In mineralogy, the hardness of a mineral is estimated by observing which of certain standard minerals will scratch a smooth surface of the given mineral, and which will not. On Mohs' scale (which is usually adopted), 10 such standard minerals are selected for the establishment of the scale, their hardness being arbitrarily defined as 1, 2, 3, etc., up to 10. The minerals that are commonly used for this purpose are as follows:

1. Talc.
2. Gypsum.
3. Calcite.
4. Fluorite.
5. Apatite.
6. Feldspar.
7. Quartz.
8. Topaz.
9. Sapphire.
10. Diamond.

A mineral which will neither scratch apatite nor be scratched by it, for example, has a hardness of precisely 5; and the same may be said of one which will both scratch apatite and be scratched by it. A mineral which feldspar will scratch but apatite will not has a hardness intermediate between 5 and 6. The decimal expressing the precise degree of hardness in such a case must be assigned by guess; but there is little use in attempting to determine a hardness more closely than to the nearest half-degree on the scale given above. The hardness of metals is measured in a totally different way, by testing the impression made by a steel ball under a determined pressure.

HARDT, Ernst, German dramatist and novelist: b. Graudenz, 9 May 1876, and was first destined for a military career. He found this little to his taste, however, and in 1892 left the Cadet School at Lichterfelde. He has lived in Greece (1893–94), Spain and Portugal (1896–97), part of the time earning a living as a teacher of German. He became theatrical critic of the *Dresdner Zeitung* in 1898, later moving to Berlin and finally settling at Weimar. His best-known work is the tragedy ‹Tantris der Narr,› the subject of which is the Tristan (q.v.) story, and which gained for him the *Volks-Schiller Prise* in 1908. A translation of this play into English, under the title ‹Tristan the Jester,› appeared in ‹German Classics› (Vol. XX, New York 1914). His short stories are of delicate tone and fine feeling, and he is also known as an excellent translator. His works are ‹Der Kampf ums Rosenrote,› drama (1903); ‹Aus den Tagen des Knaben,› poems (1904); ‹An den Toren des Lebens,› short stories (1904); ‹Ninon von Lenclos,› drama (1905); ‹Tantris der Narr,› drama (1907); ‹Gudrun,› tragedy (1911); ‹Schirin und Gertraude,› comedy (1912). Consult Elsner, R., ‹Hardt's Tantris der Narr› (Leipzig 1908); Pompecki, B., ‹Ernst Hardt› (Leipzig 1908).

HARDWARE INDUSTRY IN AMERICA. The term «hardware,» like everything else in our country, has suffered a great deal of expansion during the past hundred years, particularly as regards its application. Originally restricted to necessary articles of steel and iron, it has come to embrace in its technical and business signification a great variety of goods which have no relation at all to the original meaning of the word.

One of the potent causes of this sweeping change has been the steady reduction in the price of hardware for a long series of years. This reduction has not been altogether continuous, but with occasional uplifts during prosperous times or due to manipulation and control of the products — but on the average the trend has been steadily downward, particularly as compared with a period of 50 years ago. There are innumerable articles whose present cost is only from one-third to one-half as much now as then.

Because of the discovery and exploitation of enormous ore bodies of iron, copper and lead, among which may be instanced the great mines of Lake Superior — both iron and copper — the copper deposits in Montana and Arizona, and the lead and zinc ores in Missouri and the Southwest, and also because of the steady multiplication and increased efficiency of machinery, it became possible to produce the finished product at a steadily decreasing cost.

Experience soon showed that the field of legitimate hardware was not itself sufficiently comprehensive to enable the jobber and the retailer to transact a large enough volume of business commensurate with the cost of doing this; therefore, kindred fields were invaded and occupied, and have now become practically incorporated as part of the hardware business. Thus it has been that the great number of articles which are known as house-furnishing goods, and embrace such lines as refrigerators, ice-cream freezers and innumerable other items which go to make up the objects needed in every household — and that the line of tinware and sheet-iron, and what also have come to be known as sporting goods — not only guns, rifles and pistols, but athletic supplies — have become part and parcel of the hardware business in addition to the line of cutlery, and quite a number of other items in lines that were once entirely separate in themselves and had no relation to the hardware business. Thus the hardware retail dealer has practically reverted to the original type, in the sense of going back to the plan of the old general store and keeping pretty much all that his customers need outside of such lines as drygoods, groceries and drugs.

Hardware is, to a large extent, naturally the business of a new country because of the great amount of building and the clearing of land, though it is equally true that in the modern civilized, progressive communities of this country the use of hardware is in equal proportion to the demand caused by new countries, and much more complex and complicated in its nature.

The history of hardware is naturally the history of this country, and it can be safely said that there is no other department of mercantile business that has so kept pace with the progress of the United States, nor which to-day depicts so thoroughly all the characteristics of modern American character in all its varied details. Beginning in the crudest way with the manufacture of hand-made implements and depending almost entirely upon importation from the Old World for what was needed — even in the way of necessities of life — it has grown by giant strides, more especially since the end of the Civil War, and in many instances largely because of the protection afforded by the tariff, until to-day American hardware is practically independent of the foreigner, save in those rare instances where we have not as yet learned the mysteries of manufacture or succeeded in procuring sufficiently skilled workmen to answer the purpose. The manufacturers of hardware in America have been original in their ideas and methods and have adapted themselves absolutely to the necessities of their environments, not slavishly following the copies of Old World tools, but being guided solely by common sense and necessity. It has followed thus, particularly in edge tools, that there has been such advancement in the way of appropriateness to purposes intended and improvement in appearance, finish and design as can be scarcely equalled in any other line of business. The artistic sense has not been lost sight of, but has been appealed to as well as the sense of utility. Cutting tools are made just heavy enough and to avoid the clumsiness of the Old World items in this regard. Originality has been shown in the incessant improvement of existing models and the devising of entirely new conceptions. The manufacturer has not been content to follow the custom of ages — has had little respect for tradition or inheritance, but has set himself solely to the task of producing an effective tool at the lowest possible cost.

It is true that in no country in the world does merit in hardware command both price and popularity as in the United States, and the history of manufacturers who have been successful has been the history of merit and not because of cheapness in quality or price. The only manufacturers who have been successful for any length of time have been those who have based their products primarily on quality and who have had the faith and courage to maintain this quality in the face, often, of discouraging circumstances. It may be stated as an axiom that no hardware item of the day survives for any length of time on any other basis. The temptation to lower the standard of the quality, after reputation is established and built upon quality, has, whenever it had been yielded to, met with sure and permanent disaster.

The blacksmith of the smaller town and of the country was among the earliest makers of tools and implements, and even to this day in many localities there still survives a call for his hand-made products. The hardest fight which the manufacturers of machine-made articles have had to face has been to overcome the feeling, and often prejudice, in favor of the tool that was made by hand and that seemed consequently superior — and, as a matter of fact, the reverse has usually been the case.

Appearance counts for much — probably more in America than in any other country; attractive packages, handsome labels and beautiful finishes are as much a part of hardware to-day as the adaptability and merit of an article. There have been numerous strides in this regard, particularly when one contemplates the old-fashioned method of tying up the hardware in heavy paper with string, a package that was both clumsy and unsightly. The question of the size and nature of the package is one of great moment in the appeal to the public, and the general tendency has been to pack the goods in smaller and smaller boxes all the time, to ensure their ready sale and prevent breaking the packages, which is always so detrimental to the goods themselves, and so expensive to the dealer.

The importation of hardware is almost at an end, being confined, as before stated, to some few specialties which are slowly but surely losing their hold upon the public of this country; but, on the other hand, the exportation of American hardware — and particularly American edge tools — to all parts of the world is a large and growing business, and one of great value to the home manufacturer. The foreign business has been obtained entirely by the merit of the American article; its attractiveness, its novelty, its merit and its adaptability to the purpose intended have, after much opposition, opened the way for American hardware in all parts of the world, so that it has steadily gained ground at the expense of the foreign article.

The steady substitution of machinery for hand labor has been the most potent cause of the great success that hardware has made in the United States. The American manufacturer is never content with present conditions, but is always endeavoring to find a more efficient and more economical method of producing the finished article, and consequently endeavors to substitute machinery for hand labor. American hardware has, therefore, been placed within the reach of all, and has largely contributed to the comfort and welfare of the people.

The production and the use of hardware cannot be intelligently considered without reference to some of the leading conditions of the country — conditions of soil and climate, as well as the temperament and nature of the people. The most far-reaching and enduring change has been the substitution of what is known as mild steel for wrought-iron, due to the invention of Sir Henry Bessemer. It has rendered possible the production of hardware in all brands at very much lower prices and much more numerous forms since the production of open-hearth and of Bessemer steel. which thus supplanted those of cast-iron and of wrought-iron.

On the other hand, hardware has been very adversely affected by this change because of the consequent substitution of steel for wood, and this is most marked in the erection of the modern sky-scraper, as it is known, where there is but comparatively little hardware used, either in the erection of the building or in its subsequent finishing. These buildings having practically little or no wood in them have small use for either the carpenter or his various tools, and all that is left of hardware is a small amount of locks and trim to decorate the building and to give it security. This process has gone on in many ways until apparently it must seriously affect the continued use of hardware in all branches of life; but, on the other hand, the growth of the population has been so great that this can be safely set down as a discussion of only academic interest at present.

In a country so diversified as to soil and climate, there is a necessity for great diversity of hardware, and the goods used in the different parts of the country invariably reflect the nature and temper of the people. The South is much more conservative than the North and clings longer to old-fashioned articles of well-known reputation some time after they have been superseded in the North by more modern things. Because of the comparative poverty of the South in the past, and the fact that the negro is the principal laborer, the demand until lately has been rather for price than for quality. Again, in the extreme East very much the same conditions prevail, owing to the natural economy of the people and their extreme conservatism. The West — by which is also meant the Southwest and the Northwest — is a great consumer of hardware, and within its bounds are the great distributing hardware centres.

The steady and rapid destruction of the forests has had a far-reaching effect upon the hardware business, and one that in many cases is destined to alter permanently the use and nature of many hardware implements. In the beginning the country had to be cleared of forests, which created an enormous demand for all edge tools and stimulated the ingenuity of the manufacturers to produce articles fitted for the different needs — not alone for the different sections of the country, but also for the various kinds of wood. Now that the white pine forests have practically been destroyed, it is necessary to have edge tools that are more and more adapted for use of the hard woods which are still fairly abundant; and the question also presents itself to the manufacturers as to how long it will be possible to keep up the present production of such items as axes and cross-cut saws, in view of the fact that the forests are steadily disappearing.

It is impossible within the limit of this article to do more than briefly mention some of the leading branches of the hardware business and tell in a few words of their nature and history.

Wire Industry.— One of the most prominent to-day is that of the wire industry, because it ramifies and affects almost every part of the hardware business. It early felt the impetus of the advantages offered by the Bessemer steel process, since it was possible to produce in wire made from steel many items which could not be drawn from wrought-iron. It is difficult to state with exactness — because of the connection with other branches of iron and steel manufacture — but there is probably invested in wire manufacture more than $200,000,000. The United States Special Census of Manufactures in 1914 reported the number of establishments making wire to be 54, employing $64,013,668 capital and 17,600 wage earners who received annually in wages $11,020,729. The cost of materials used amounted to $56,424,494, and the value of the product was $81,841,012. These figures are exclusive of the wire-work industry, which includes wire fencing: many of the larger concerns make the wire which is afterward worked up into form. Few things have been of greater interest than the story of barbed wire and its enormous growth since its introduction. It is probably the cheapest fencing ever placed upon the market, and exactly met the demands of the new country where thousands of acres had to be fenced in at a time. It is still a product of great tonnage, but its place is being slowly but surely taken by the woven-wire fencing which, though higher in price, is more effective and is better suited now for the country, which is gradually being cut up into smaller farms. The enormous volume of barbed-wire used in military defenses during the late war was in large part made in specially equipped establishments which are likely to disappear as such and develop other industries. No statistics as to these factories are available.

Nail Industry.— The nail industry is a conspicuous example of the chance and changes in manufacture, for in the beginning the iron cut nail, first as made by hand and afterward by machinery, had behind it the prestige of centuries, and seemed to be enduring as an article of everyday use. It was found, however, that with the growth of the Bessemer steel business, the steel cut nail could be made cheaper, although it was not in any way a better article. Its place, in turn, is being taken by the wire nail, which is much more comprehensive in its uses than the steel cut nail, though the latter style prevails in certain sections and for certain purposes, but the decline of the steel cut nail is as marked in its way as the rapid increase in the use of the wire nail. See NAILS.

Tacks.— The kindred industry is that of tacks, but it has been seriously hurt by the expansion of the wire nail, since it is possible to make the latter in many forms and sizes that are substitutes for tacks. This industry was founded in Taunton about 85 years ago, and for a great number of years was practically confined to New England. It spread gradually westward to Pittsburgh; there it almost died out, and has since taken some hold further west in Cleveland and Chicago. Owing to the encroachment of the wire nail it has declined rather than advanced, and the number of manufacturers has greatly decreased. The product is not large — probably not more than 15,000 tons per annum.

Farming Tools.— The making of farming tools and what are known technically as "steel goods" is one of the most important industries in the hardware line, since with these tools the crops are cultivated and gathered. The steady progress of the American manufacturer has been in the direction of producing items which were light, strong and handsome in appearance. The diversity of soil and climate mean great diversities of various items used in cultivating the ground, and the number grows each year. The business does not keep pace with the growth of the country owing to the steadily increasing use of labor-saving machinery. The mower and the reaper have taken the place of the snath, the cradle and the scythe — the corn binder of the corn knife; and the corn planter and the cultivator have gradually diminished the use of hoes. The amount of capital invested is not exactly known, but does not probably exceed $3,000,000. The absolute importance of these tools to the country is rather striking contrasted with the small annual output in dollars and cents. See Farm Machinery.

Builders' Hardware.— The builders' hardware business is often considered the centre of the hardware trade, because of its great importance as related to the hardware industry as a whole. Builders' hardware is an exceedingly comprehensive term and does not admit of exact definition. It is ordinarily used in reference to locks (see Locks) and trim and to all the various items which find employment in the building of a house. It is a business of immense complexity and has a most interesting history. It began far back in New Haven and New Britain, Conn., as early as 1834, and the first goods were naturally crude and rough. Shortly, however, the ingenuity of the American manufacturer produced a new article in the shape of the cast-iron lock, thus departing entirely from the wrought lock, which was formerly known to England, Germany and France. The cheapness of the cast-iron lock and its actual efficiency soon caused it to displace the foreign article. Since that time the sheet steel lock has been made in this country, but in a much smaller and more condensed form than the wrought lock of Europe.

Builders' hardware has a most interesting history since it is in part the story of the development of taste in America. The Centennial Exposition of 1876 did much to educate the people of this country in the way of good taste and high artistic ideals. There gradually came a demand for things of daily use which should have beauty as well as utility and particularly of late years this feeling has spread to locks and trim and all forms of builders' hardware, with increasing emphasis. The leading manufacturers have innumerable designs which are suitable for the different schools of architecture, such as Gothic, Renaissance and Colonial, or any of the variations of the standard schools. All high-grade builders' hardware is now got up in shape and design to match appropriately not alone the building, but each separate room where the rooms are finished and ornamented differently. It is, therefore, largely a thing of ornament as well as of use and the ingenuity of the manufacturer and the salesman has been taxed to keep pace with the demands of the consumer for novelty and appropriateness. The annual production is probably something like a matter of $25,000,000 in value. The finest grades of hardware are still made largely in the East, principally in Connecticut, but the business is slowly but steadily drifting west in keeping with the general trend of hardware manufacture.

Shovels.— The first shovels in this country were produced as far back as 1776 by Capt. John Ames, who made them by hand in competition with the English article. The business then established was carried on for the succeeding 27 years, and constituted the nucleus of the present large concern of the Oliver Ames & Sons corporation, whose headquarters are in Northeastern, Mass. Mr. Oliver Ames, the son of Capt. John Ames, established in 1803 a shovel plant where he soon produced shovels that were superior to those imported from England. In 1797 Thomas Rowland commenced the manufacture of shovels at Cheltenham, Pa., and this plant has been in continuous operation ever since. Business gradually crept westward and is now spread over the country as far west as the Mississippi River. By 1854 there were about 80,000 dozen shovels produced annually, but with the growth of the country this product has been largely increased until the annual output is now about 600,000 dozen. As with all other hand tools, the demand for shovels has been seriously affected by the introduction and improvement of labor-saving machinery — such as the steam shovel, the coal and ore conveyor and other mechanical devices for loading and unloading. It is interesting to note that the original machinery for making shovels has not been greatly improved upon so far as the actual efficiency is concerned, although the variety of shovels has been greatly increased to meet the wants and tastes of the different parts of the country. It is difficult to approximate with any reasonable degree of accuracy the amount invested in this business, but it is in the neighborhood of $4,700,000.

Saws.— There are few things more difficult to make than saws, and they have been the subject of study of some of the most talented and ingenious manufacturers of the country. They were manufactured as far back as 1806 in Philadelphia, though in a very small way. In 1820 a factory was established in Bristol, Conn., by Irenus and Rollin Atkins, Rollin Atkins being the father of E. C. Atkins, the founder of E. C. Atkins & Company, of Indianapolis, who now have one of the largest saw plants of the world. It was necessary to import the first saw makers from England.

In 1840 Henry Disston, an Englishman by birth, really made the great beginning of the saw-making industry in Philadelphia, and soon produced saws that had no equal in the world. It was only a short time before the Disston saws drove out the English brand entirely from this country, and to-day this firm have not only achieved a world-wide reputation for merit but send their products all over the globe. The annual output of all saws amounts to between $10,000,000 and $12,000,000, and there is about that amount of capital invested in the business. The tonnage of steel used in the manufacture of saws varies from 15,000 to 20,000 tons per annum.

American saws, particularly hand saws, are pre-eminent in America and have no equal abroad. Outside of the Disston factory there are several very large and prominent makers, among them E. C. Atkins & Company of Indianapolis, Ind., and the Simonds Manufacturing Company, who make their headquarters at Fitchburg, Mass. The saw business has been notable because of the genius shown by the manufacturers, and in this respect Henry Disston is pre-eminent. There are probably something like between 5,000 and 6,000 people employed permanently in the business. See Saws and Sawing.

Axes— Axes have always been among the most important items in the hardware business because of the great need of them in felling the forests with which the country was covered in the early days. They are of innumerable sizes and shapes to suit the needs of the lumbermen and the users. The production has not increased of late years, due not only to the deforestation of the country, but also to the fact that the place of axes is being largely taken by cross-cut saws. The annual output is somewhere between 350,000 and 400,000 dozen. As in other lines of business, there have been great consolidations, so that a few large concerns have taken the place of innumerable small ones. The use of natural gas has had a most important effect on the manufacture of axes, since with it a very much superior tool can be made, and it is also of great advantage in tempering. It is noticed in regard to the matter of tempering — a thing of vital necessity in all edge tools — that practically there has been no improvement in this regard for several centuries. Not alone did many of the implements of the ancients equal in temper the best that can be produced now-a-days, but in many cases they were much superior. The difficulty seems to lie in the fact that tempering is purely a thing of experiment and not of scientific development, the reason for it not being known, nor why some metals can be tempered and others cannot. In the beginning axes were originally made by hand as were all the other hardware implements, but later the tendency developed to establish small factories on available water powers throughout the country, as at Pittsburgh, Pa., Lewistown, Pa., East Douglas, Mass., and Collinsville, Conn. With the enormous demand for the goods, this industry soon outgrew its “leading strings” and established itself at more available locations.

Edge Tools— The item of edge tools is a very large one, and, next to builders' hardware, probably the most important in the whole range of hardware proper. It embraces practically everything with a cutting edge such as hatchets, chisels, drawing knives, planes and the like, and space forbids any attempt at more than generalities. It is interesting to note that on such small items as chisels, drawing-knives, adzes and hatchets, the advance within a period of 1,000 years has been rather in attractiveness of form and appearance than in actual adaptability or merit. Some tools dug up from the Roman camp of Salzburg are, so far as adaptability goes, quite equal to any that are made up now-a-days. The simplicity of the articles mentioned has largely rendered them incapable of any great improvement. In the more complicated lines such as planes and the like there have been very great changes and improvements, and the plane industry, particularly, is one of enormous proportions. The manufacturers who have attained a reputation in edge tools have done so purely on the score of merit and because of the fact that each manufacturer made only one particular line, no one thus having a complete line of edge tools of uniform excellence, design and efficiency; and one of the great causes of the demand for American hardware abroad — particularly since the Spanish War — has been the fact of the assembling of a complete line of high grade tools under one brand, so that the foreigner realized that anything that bore that particular trade-mark could be depended upon as being uniform in quality and efficiency. Among the somewhat lesser items in the tool line have been the interesting developments in auger bits of innumerable designs and patterns, with varying adaptability for different kinds of work. See Tools.

Files.— There are few things of greater importance to the hardware dealer than files, and the story of the development of the file industry is interesting. They are articles which have to be made with the greatest care and go through a great number of processes before they reach perfection and are fitted for use. The five leading operations requisite are forging, annealing, grinding, cutting and hardening. They were formerly made entirely by hand, and even to this day there still exists among a few the preference for the hand-made file. The history of the business really dates from the practical use of a machine to cut files, patent for which to all intents and purposes was first issued to William Nicholson in 1816. There are records of file-cutting machines in France as far back as 1699, and several since that time up to the 19th century, but none of them apparently of any practical value. The first really important attempt to manufacture files was soon after 1850 at Ramapo, N. Y., a company being organized under the name of the American File Company, with large capital. The life of the attempt was short, however, and the business was soon discontinued. Various attempts were made shortly after that — both in this country and England — to manufacture files by machinery, and none of them had any extended experience.

About 1863, Mr. William T. Nicholson, of Providence, R. I., gave the matter of file cutting by machinery his personal thought and attention. He had long training as a mechanic and practical experience in the finest branches of machinery. At that time the great source of supply of files for this country was the hand-made files of England, and the story of attempts to cut files by machinery had been one of sunken capital, ruined hopes and dismal failures. From this beginning grew the great present firm of the Nicholson File Company, which largely dominates the file trade in this country and has an enormous export business. They have produced better and cheaper files than it is possible to cut by hand, and have carried the business apparently to the point of perfection. The importation of files has fallen to about $75,000 per annum, while the total output of American files does not fall short of $6,000,000, and is represented by total investments of approximately $12,000,000. See Files and Filemaking.

Rasps.— Few things have been more marked than the determination of the American manufacturer to produce successfully a machine-cut horse rasp. It followed a long way in the wake of the machine-cut file, and after many discouragements — the principal difficulty being to overcome the inveterate prejudice of the blacksmith. To-day hand-cut horse rasps are a thing of the past.

Bolts and Nuts.— The manufacture of bolts and nuts dates as far back as 1798, a patent for screw machinery at that time being issued to David Wilkinson, a celebrated mechanic of Rhode Island. There were various other patents granted and these gradually developed in later years into the present slotters, threaders, pointers and tapers. By slow growth and by innumerable inventions and improvements this industry has attained its present enormous proportions and is represented to-day by more than 100 establishments, which manufacture all of the various kinds and styles of bolts, the yearly product being something like 1,000,000,000 bolts, valued at nearly $25,000,000.

Screws.— The manufacture of screws — or, as they are technically known, wood screws — is one of the important developments of this country, though the demand does not keep pace with the growth of the country owing to the continued substitution of steel for iron, and consequently of bolts and rivets for screws. Screw machinery is of the highest type of automatic efficiency and almost equals human intelligence in its working. Patents for various devices on screw machinery date back into the latter part of the 18th century, and innumerable patents have have been issued since that time. The real beginning of successful manufacture was in 1838 when the Eagle Screw Company was incorporated in Providence, R. I., the leading spirit being Mr. William G. Angel. In 1846 Mr. Angel finally perfected the machine for making what is known as the gimlet point on a screw — up to that time it had a blunt point. From this time dates the prosperity and growth of his company, which grew into the present American Screw Company. There are now some 13 large concerns engaged in the manufacture of screws and scattered from New England to the Mississippi River. See SCREWS.

Tin Plate.— The tin plate and sheet iron industry has kept pace with the general growth of the iron industry all over the country, and has been greatly fostered by a protective tariff since the time of what has been known as the McKinley Bill. Its production in this country has grown at an enormous rate, as may be seen from the statement that in 1892 there were only about 18,000 tons of tin plate produced in this country as against about 1,026,983 tons in 1914. The industry is chiefly represented by what are known as black sheets, tin plates, and terne plates — all of which have now become integral parts of the hardware business. See TIN PLATE.

Tinware.— Among the lines which were originally independent, but which have practically become now incorporated with the hardware business, is that of the tinware industry in all its various ramifications. The retail hardware shop has practically absorbed the tinners' shop, and because the fact that hand-made tinware is fast being supplanted by the product of the stamping company, the hardware retailer has gone into the handling of tinware in all shapes and varieties.

Enameled Ware.— Coincident with this is the development of what is known as enameled ware, being a coating on the sheet steel in place of the tinning. It is of all colors and varieties and has grown to be a business of great importance. It illustrates distinctly the general desire of the people for something more tasteful and artistic in appearance than the old-fashioned tinware.

Mechanics' Tools.— The American manufacturer has shown to great advantage in the manufacture of high grade mechanics' tools for exceedingly fine measurements. In this respect the Brown & Sharpe Manufacturing Company, of Providence, R. I., occupy a commanding position and their products to-day are sought for all over the world where exceeding accuracy is necessary. As an example, the micrometer caliper will measure with absolute accuracy the 250,000th part of an inch. For an attainment of such results, the finest tools made by any other nation cannot be compared with those of America.

Cutlery.— Few things are more interesting than the history of cutlery-making in the United States, as it has suffered many "ups and downs," not alone from various foreign competition, but from the difficulty of procuring sufficiently skilled labor to produce the proper article. The manufacture of scissors and shears — which are always treated as a part of the cutlery business — has been unique in the fact that it was a Yankee genius who first solved the problem of welding a high grade steel blade to a soft casting of iron backing made to fit the hand, this being the invention of Seth Boyden in 1826. The actual manufacture of shears in this country seems to have been commenced by R. Heinisch in 1825 at Elizabethport, N. J. This was followed by others until at present the American shears have been so developed and improved as to be far ahead of any in the world. Prior to 1832 table cutlery was imported very largely from England. From that year American manufacturers began in a small way to produce these goods and by 1865 they had practically taken the business unto themselves. There is a large export trade business in table cutlery owing to the superior quality of the goods made in this country.

The making of pocket cutlery is one of the most interesting things connected with the hardware business in America. It was started at Lakeville, Conn., by the Holley Manufacturing Company about 1845. The total annual capacity was probably less than $50,000. The business was gradually extended in a small way and finally a co-operative colony was established at Walden, N. Y., and since then this line of American industry has largely centred in the two States of New York and Connecticut. Innumerable factories have been started and have failed, largely owing to the lack of foresight on the part of the manufacturers in attempting to compete with the cheap labor of Europe in producing goods cheap in quality and finish as they were in price. The co-operative colony spoken of grew by slow degrees and economical management, having the advantage of large water-power at Walden, until they finally became one of the leading makers, not alone of this country but of the world, and were enabled to show at the Louisiana Purchase Exposition products superior to those made abroad, for which they received the highest award. It is an interesting case of development in the way of quality and of merit by patience and skill. In 1914 there were 32 makers of pocket knives in the United States, with an annual production valued at over $4,000,000. The number of establishments making other cutlery and edge tools numbered 252 with a total capital of $35,666,000 and employing 16,561 wage-earners.

The annual output was valued at $25,541,000, of which $8,186,000 represented cost of materials, and $9,076,000 wages. For a discussion of this subject as it relates to the metropolis, consult Pratt, E. E., 'The Hardware Industry in New York City' (*Hardware Dealers' Magazine,* 1913, pp. 1211 *seq.*). (See CUTLERY).

HARDWICK, Charles, English Church historian: b. Slingsby, near York, 22 Sept. 1821; d. near Toulouse, France, 18 Aug. 1859. After studying at Saint John's College and Catherine's Hall, Cambridge, he became Fellow at the latter place, select preacher at Cambridge (1850), preacher at the Chapel Royal, Whitehall (1851), and professor of divinity at Queen's College, Birmingham (1853). Two years later he became lecturer on divinity at King's College, Cambridge, and in the following year was elected to a seat in the newly-established council of the senate. In 1859 he was appointed archdeacon of Ely, but was killed shortly afterward in a fall while in the Pyrenees. He was the author of several noteworthy works on Church history, including 'History of the Articles of Religion' (1851); 'History of the Christian Church, Middle Age' (1853); 'A History of the Christian Church During the Reformation' (1856); 'Christ and Other Masters' (1855–59; 2d ed., 1863), containing a memoir by F. Procter.

HARDWICK, Thomas William, American public official: b. Thomasville, Ga., 9 Dec. 1872. He was graduated at Mercer University in 1892; studied law at the Lumpkin Law School, University of Georgia; and was admitted to the bar in 1893. He established his practice at Sandersville, Ga., was prosecuting attorney of Washington County in 1895–97 and member of the Georgia house of representatives from 1898 to 1901. From 1903 to 1915 he was member of the National House of Representatives from the 10th Georgia District. On 2 Sept. 1914 he was nominated by the State Democratic convention of Georgia to fill the unexpired term of the late Senator A. O. Bacon, and was elected to the United States Senate on 3 Nov. 1914 for the term ending 3 March 1919.

HARDY, Arthur Sherburne, American diplomat and novelist: b. Andover, Mass., 13 Aug. 1847. After a single year at Amherst College he entered West Point Military Academy, graduating in 1869. He became a second lieutenant in the 3d Artillery regiment, saw some service during 1869 and 1870, and then resigned to become a professor of civil engineering at Iowa College for a brief time. In 1874 he went to Paris to take a course in scientific bridge-building and road-constructing, returning to take a professorship in that line of instruction at the Chandler Scientific School, connected with Dartmouth College. He assumed a similar professorship at Dartmouth College in 1878. This position (in connection with which he published 'Elements of Quaternions' (1881), followed by his translation of 'Argand's Imaginary Quantities,' by his own 'Analytical Geometry'; and 'Elements of the Calculus'; 'Imaginary Quantities'; and 'Methods in Topographical Surveying') he held until 1893, when he became editor of *The Cosmopolitan Magazine.* He was United States Minister to Persia, 1897–99, and Envoy Extraordinary and Minister Plenipotentiary to Greece Rumania and Serbia, 1899–1901; to Switzerland, 1901–03, and to Spain since 30 Jan. 1903. His works include 'But Yet a Woman' (1883); 'The Wind of Destiny' (1886); 'Passe Rose' (1889); 'Songs of Two,' poems (1900); 'Life and Letters of Joseph Hardy Neesima' (1891); 'His Daughter First' (1903); 'Aurelie' (1912); 'Diane and Her Friends' (1914).

HARDY, Edward John, English author and clergyman: b. Armagh, Ireland, 7 May 1849. He took orders in the Anglican Church, became an army chaplain, in 1903 was stationed at Hongkong and in 1905 in Egypt. He is known the world over as the author of 'How to be Happy though Married' (1884), which has been translated into many languages. Other works by him are 'Manners Makyth Man' (1885); 'Faint yet Pursuing' (1886); 'Uncle John's Talks with his Nephews' (1886); 'The Five Talents of Woman' (1888); 'The Love Affairs of Some Famous Men' (1897); 'Mr. Thomas Atkins' (1900); 'Concerning Marriage' (1901); 'Love, Courtship and Marriage' (1902); 'Pen Portraits of our Soldiers' (1902); 'Love Rules the World' (1905); 'John Chinaman at Home' (1905); 'How to be Happy though Civil' (1909); 'The Unvarying East' (1912); 'The British Soldier, His Courage and Humor' (1915).

HARDY, Iza Duffus, English novelist, daughter of Sir Thomas Hardy, the English historian. Among her numerous novels are 'Glencairn'; 'Only a Love Story'; 'A Broken Faith'; 'The Love that He Passed By'; 'A Woman's Loyalty'; 'The Lesser Evil'; 'Man, Woman, and Fate'; 'A Butterfly'; 'The Silent Watchers,' etc., and two volumes of transatlantic reminiscences, 'Between Two Oceans' (1884), and 'Oranges and Alligators: Sketches of South Florida Life' (1886).

HARDY, Thomas, English novelist: b. Upper Bockhampton, near Dorchester, Dorsetshire, 2 June 1840. The Hardys descend from Thomas Hardy of Melcombe Regis (d. 1599), who was a scion of the old Jersey family of Le Hardy. He was educated at local schools and at 16 was articled to an ecclesiastical architect in Dorchester. In 1863 he gained the prize medal of the Institute of British Architects with an essay on "Colored Brick and Terra-Cotta Architecture." His special studies, apart from his profession, were the Greek and Roman classics, and that these exercised a strong influence on his mind may be seen from his literary work. He had written several poems before his first published article, "How I Built Myself a House," appeared in *Chambers' Journal* (18 March 1865). He afterward wrote a novel of a revolutionary and anti-social type which fell into the hands of George Meredith as publisher's reader, who advised him to adopt, on his first introduction to the public, "a gentler guise." Mr. Hardy thereupon suppressed this novel and in 1871 made his first essay in fiction before the public (anonymously) with 'Desperate Remedies' (1871). It was followed in 1872 by 'Under the Greenwood Tree' (also published anonymously), a beautiful idyll the rustics in which are depicted with a quaint and compelling humor; and by 'A Pair of Blue Eyes' in 1873. 'Far From the Madding Crowd'

(1874), which appeared in serial form unsigned in *Cornhill Magazine*, first established his fame, and was by many attributed to George Eliot. His other works in order of publication are ‘The Hand of Ethelberta’ (1876); ‘The Return of the Native’ (1878); ‘The Trumpet-Major’ (1880); ‘A Laodicean’ (1881); ‘Two on a Tower’ (1882), first published in the *Atlantic Monthly*; ‘The Mayor of Casterbridge’ (1886), a powerful and tragic story; ‘The Woodlanders’ (1887); ‘Wessex Tales’ (1888); ‘A Group of Noble Dames’ (1891); ‘Tess of the D'Urbervilles’ (1891), a study of original womanhood on the rack of misfortune; ‘The Well-Beloved’ (1892); ‘Life's Little Ironies’ (1894); ‘Jude, the Obscure’ (1895), which first appeared serially in *Harper's Magazine*, a depressing book remarkable for its minute depiction of sensuality, and in which the quaint bumpkins who act the part of chorus in Hardy's other tragedies are unrepresented; ‘The Well-Beloved’ (1897); ‘Wessex Poems’ (1898); ‘Poems of the Past and Present’ (1902); ‘The Dynasts,’ a drama (in three parts, 1904, 1906, 1908), in which the author interprets the Napoleonic era, in 19 acts and 130 scenes; ‘Time's Laughing-stocks and Other Verses’ (1909); ‘A Changed Man’ (1913); ‘Satires of Circumstance’ (1914).

Thomas Hardy is the literary interpreter of Wessex (the land of the West Saxons), but specifically of his native Dorsetshire, which was within its area. The localities of his novels can be readily identified; a map has been published which assigns to each novel the localities of its various parts. The vanishing types of the rural life of Dorsetshire — farm hands, shepherds, woodlanders, carriers, etc.— people his works, and to future ages will be seen as he saw them. They depict the struggles of individuals against the blind natural forces that control the world, and by whom they find themselves crushed and broken. In ‘Tess of the D'Urbervilles’ he has shown how cruelly the conventions of the world may react on and bring to ruin a life that under natural conditions should have been one of happiness. In ‘Jude, the Obscure,’ the study of dual personality is revealed with gripping of somewhat sordid realism; the lower nature constantly dragging down the higher. His treatment of the sexual instinct increased in frankness in the later of his great novels, the two just cited. He knows the peasantry as no other English novelist has ever known them; their patience and impassiveness under misfortune, their grandeur in «the endurance of dooms»; and, without slavishly reproducing it, their dialect becomes in his hands a medium, racy of the soil, and impregnated with the salt of an engaging and suggestive humor. He knows nature in all its moods, but is most at home in its more sombre aspects, as when describing the bleak wastes of Egdon Heath. His language is almost severe in its simplicity, self-repression and freedom from exaggeration. His works, full of humor though they are, yet leave the reader with a deep sense of the sadness of the human lot, and have been described as «an austere descant upon the dust and ashes of things, the cruelty of lust, the fragility of love.» He was awarded the Order of Merit in 1910. Consult Child, ‘Thomas Hardy’ (New York 1916); Johnson, ‘The Art of Thomas Hardy’ (London 1895); Macdonell, ‘Thomas Hardy’ (ib. 1894); Sherren, ‘The Wessex of Romance’ (new ed., ib. 1908); Windle, ‘The Wessex of Thomas Hardy’ (ib. 1901). See Far From the Madding Crowd; The Return of the Native; Tess of the D'Urbervilles.

HARE, Augustus John Cuthbert, English descriptive writer: b. Rome, Italy, 13 March 1834; d. Saint Leonards, 22 Jan. 1903. His life was spent mainly in travel, on descriptions of which his fame chiefly rests. Among his many works may be cited ‘A Winter in Mentone’ (1862); ‘Walks in Rome’ (1871); ‘Wanderings in Spain’ (1873); ‘Memorials of a Quiet Life’ (1872–76); ‘Days near Rome’ (1875); ‘Walks in London’ (1878); ‘Days near Paris’ (1887); ‘Sussex’ (1894). His autobiography was published in six volumes (1896–1900).

HARE, Sir John (John Fairs), English actor: b. London, 16 May 1844. He made his first appearance in Liverpool in 1866, then going to London played at the Prince of Wales Theatre, and later was manager successively of the Court, the Saint James, the Garrick and the Globe theatres. He became distinguished as a comedian, and visited the United States, playing in the chief cities. The plays he has brought out include ‘A Scrap of Paper’; ‘Still Waters Run Deep’; ‘A Bachelor's Romance’; ‘The Profligate’; ‘The Notorious Mrs. Ebbsmith’; and ‘Gay Lord Quex.’ He was knighted in 1907. Consult Pemberton, ‘John Hare, Comedian’ (1895); Winter, ‘The Wallet of Time’ (2 vols., 1913).

HARE, John Innes Clarke, American jurist: b. Philadelphia, 17 Oct. 1817; d. 1905. Graduated from the University of Pennsylvania in 1834, he was admitted to the bar in 1841, was successively associate and presiding judge of the Philadelphia District Court (1851–75), and in 1875–95 presiding judge of the Court of Common Pleas. He was also for a time professor of the institutes of law in the University of Pennsylvania, and published ‘American Leading Cases’ (1847, with Wallis); ‘The Law of Contracts’ (1887); ‘American Constitutional Law’ (1889); 11 volumes of chancery reports and other works.

HARE, Julius Charles, English theologian: b. Valdagno, Italy, 13 Sept. 1795; d. Hurstmonceaux, England, 23 Jan. 1855. He entered Trinity College, Cambridge, in 1812, and became Fellow and tutor there in 1818. Ordained in 1826, he became rector of Hurstmonceaux in 1832, where he remained for the rest of his life. He was appointed archdeacon of Lewes, and chaplain to the queen in 1840. He was of the Broadchurch party, and was prominent because of his liberality of thought and his scholarship. His publications include ‘Guesses at the Truth by Two Brothers’ (1827); ‘The Mission of the Comforter, with Notes’ (1846), containing an able defense of Luther; ‘The Victory of Faith’ (1840); ‘The Contest with Rome’ (1841). With Bishop Thirlwall he translated Niebuhr's ‘History of Rome’ (1828–32); and wrote the text for König's illustrated life of Luther. His ‘Charges’ appeared posthumously (1856).

HARE, Robert, American scientist: b. Philadelphia, 17 Jan. 1781; d. there, 15 May

1858. As a boy he worked in his father's brewery, studied chemistry privately and in 1818 became professor of chemistry in William and Mary College, and professor of chemistry in the University of Pennsylvania until 1847. He will be longest remembered for his discovery of the oxyhydrogen blowpipe to which he gave the name «hydrostatic blowpipe.» For this invention he was awarded the Rumford medal of the American Academy of Arts and Sciences. He also invented the valve-cock, the calorimeter and a process for denarcolizing laudanum. He improved the manufacture of potassium; extracted sugar from the sweet potato; and was the first to use mercury as a cathode in industrial and analytical operations. Hare also demonstrated that foggy air is not a conductor of electricity, that platinum could be rendered molten and easily worked, and constructed the first electric furnace. The Smithsonian Institution placed him on its roll as its first honorary member, and his collection of chemical and physical apparatus is there preserved. He wrote 'Brief View of the Resources of the United States' (1810); 'Chemical Apparatus and Manipulations' (1836); 'Memoir on the Explosiveness of Nitre'; and many other papers on scientific subjects. Consult Smith, Edward F., 'The Life of Robert Hare' (Philadelphia 1917).

HARE, William Hobart, American Protestant Episcopal bishop: b. Princeton, N. J., 17 May 1838; d. 25 Oct. 1909. He studied at the University of Pennsylvania, was ordained priest in 1862, was minister of Saint Luke's, Saint Paul's (Chestnut Hill) and other churches of Philadelphia, and in 1873 was consecrated missionary bishop of Niobrara. In 1883 his diocese, having been enlarged so that its limits were identical with those of the Territory of South Dakota, was renamed that of South Dakota. He became known as an authority on the Indian question, and wrote pamphlets on mission work in the western United States. Consult Howe, 'Life and Labors of Bishop Hare' (1911).

HAREBELL, or BLUEBELL, a familiar species of bell-wort (*Campanula rotundifolia*), common throughout the northern parts of the whole northern hemisphere (see BLUEBELL; CAMPANULA), growing in dry and hilly pastures, on waysides and open lands generally. It is, however, rare in America south of Canada, although other species are to be found here. It is perennial, with a slender stem 6 to 14 inches high, bearing a loose raceme of a few drooping flowers, on very slender stalks; the flowers, generally bright blue, but sometimes white, bell-shaped and about half an inch long, appear in summer and autumn. The juice of the flowers yields a fine blue color, and may be used as ink.

HAREL, Paul, pōl ā-rĕl, French innkeeper-poet: b. Echauffour (Orne), 1854. He became landlord of the «Croix Saint-Andre,» an inn at Echauffour, and within a modest range of subject wrote picturesque verses in an excellent lyric style. He was elected to the Caen Academy, and on the recommendation of Sully-Prudhomme received a prize from the Académie Française. Among his works are 'Sous les Pommiers' (1879); 'Rimes de Broche et d'Epée' (1883); 'Aux Champs' (1886): and 'L'Herbager,' a three-act poetic drama (1891); 'Les Dyspeptiques' (1908).

HARELIP. A deformity of the upper lip, due to some prenatal influences, causing it to divide vertically on either or both sides of the middle line. Sometimes a cleft palate accompanies harelip. The affliction is susceptible to treatment, but a slight operation, a few months after birth, is commonly necessary. The palate, however, should not be operated upon before the age of four or five. Treatment of the cleft palate, when present, may be given simultaneously with that of the lip deformity. See CLEFT PALATE.

HAREM, or HAREEM' (Ar. «the prohibited»), is used by Mussulmans to signify the women's apartments in a household establishment, forbidden to every man except the husband and near relations. The practice of erecting and maintaining a separate apartment for the women of a well-to-do household dates back to early times in Chaldea. The Egyptian palaces followed with the most elegantly equipped constructions for the harem. The Scriptures, the Odyssey and various ancient chronicles all refer to the harems. The Persians, Babylonians, Hindus, Arabs, Siamese and ancient Peruvians all maintained harems. But it is the Turkish harems of which most has been written. The women of the harem may consist simply of a wife and her attendants, or there may be several wives and an indefinite number of concubines or female slaves, with black eunuchs, etc. The management of the establishment is generally entirely in the hands of the females. The greatest harem is that of the sultan of Turkey. The women of the imperial harem are all slaves, generally Circassians or Georgians. Their life is spent in bathing, dressing, walking in the gardens, witnessing the voluptuous dances performed by their slaves, etc. The women of other Turks enjoy the society of their friends at the baths or in each other's houses, and appear in public accompanied by slaves and eunuchs; but the women of the sultan's harem have none of these privileges. It is of course only the richer Moslems who can maintain harems; the poorer classes have generally but one wife. Consult Harvey, 'Turkish Harems and Circassian Homes' (1871); Lane, 'Manners and Customs of the Modern Egyptians' (1871); Loti, Pierre, 'Les Desenchantees' (1906); Van Sommer and Zwener, 'Our Moslem Sisters' (1907).

HARES. In the United States the names hare and rabbit are used indiscriminately for various species of rodents of the family *Leporidæ*. Hare is the generic term, while rabbit is applied properly to single short-legged European species of essentially burrowing habits whose naked blind and helpless young are nurtured in underground nests (see RABBIT). None of the native American species have these characteristics. The second pair of upper incisors are small, non-functional and placed directly behind the large gnawing teeth, a peculiarity which distinguishes the hares and a few allied forms from all other rodents. The ears are always large, the tail short, bushy and upturned, the forelimbs short and five-toed, the hind ones long and four-toed and the soles of the feet densely hairy. Hares are exclusively vegetarian. They are extremely timid, alert and have keen senses. They move with peculiar erratic leaps and with great speed for short distances and walk with a peculiar shuffling gait by placing the entire sole of the hind foot on the ground. A favorite attitude is that of resting on the haunches with the head erect; but the forelimbs lack altogether the prehensile powers of the squirrels. None of them are arboreal or aquatic. The older catalogues enumerate from 20 to 30 species from all parts of the world except Australasia, but chiefly belonging to the northern hemisphere. With a very few exceptions all the hares are included in the single genus *Lepus*.

The gray rabbit, wood rabbit or cottontail (*L. floridanus* or *L. sylvaticus*) is very plentiful throughout eastern North America north to Ontario. It frequents thickets and brier patches on the borders of woods, multiplying excessively in the more thickly settled regions and replacing the more retiring varying hare. All kinds of succulent herbage, bark, berries and buds, the latter especially in winter, form the rabbit's food which it seeks to a large extent along regularly established runways, not infrequently leading to the farmer's truck-patch. Although it does not itself burrow, the cottontail frequently escapes its pursuers by retreating into the holes of woodchucks, skunks, etc., in this respect and some others resembling the true European rabbit more closely than any other American species. Several broods of four to six young are raised each year. At birth they are blind and helpless, and are protected in a nest built in a depression in the ground of dried grass or weeds lined with the rabbit's own fur, with which they are covered when left alone by the mother.

The varying hare or white rabbit (*L. americanus*) is a larger species with longer hind legs, taking its name from the alternating brown and white color of summer and winter respectively, a change which is less complete southward. The white winter coat is produced, on the approach of snowy weather, by an actual disappearance of the brown pigment in the hairs. The brown coat in spring is resumed by the molting of the old white hairs and the growing of a new brown coat. In one or other of its varieties this hare ranges from Virginia northward to Hudson Bay and is common in the hemlock forests northward. This is a typical hare, which depends for its safety from foxes, lynxes, weasels, hawks, owls and numerous other enemies solely upon its quick senses and great speed, aided by the concealing effect of its white fur in winter. It never enters burrows, but lives by day and night with no other shelter than that afforded by thickets. Feeding chiefly by night it travels along regular runways used in common by several individuals, a fact which is sometimes taken advantage of by foxes and other enemies to compass their destruction. A favorite winter food is the bark and buds of the birch tree. Scarcely any nest is formed for the young, which are fully active a short time after birth. A somewhat similar species is the polar hare (*L. arcticus*), a pure white species of high northern latitudes. These hares are the principal resources for food of all the northern carnivores, especially the foxes, martens and lynx. They are much subject to intestinal diseases, which at intervals of about seven years reduce their numbers almost to extinction and this has a very serious effect on the fur-bearing animals and the market receipts of their pelts, and on the native Indians of the far north.

The jack-rabbit or prairie hare (*L. campestris*) is representative of a group of large, long-legged, big-eared hares that inhabit the Western plains and whose lives are spent mostly «on the jump.» For short distances they are perhaps the swiftest quadrupeds known. Their lives are spent among the bushes, upon twigs of which they feed, and where their young are dropped and within a short time required to shift for themselves. In cultivated districts the jack-rabbits increase enormously and become great pests. As a consequence they are much hunted, not only with dog and gun and snare, as are the Eastern species, but by the organization of extensive «drives,» which result in the destruction of thousands, the bodies of which are shipped to the markets. Coursing them with greyhounds after the English fashion (see COURSING) is an exciting and favorite sport. Their fur is extensively utilized for making felt hats.

The marsh hare (*L. palustris*) and water hare (*L. aquaticus*), of the southern Atlantic seaboard and the Mississippi Valley respectively, are rather short-legged species, which differ from the others in the readiness with which they will enter water.

In Europe the common hare (*L. timidus*), the mountain hare (*L. variabilis*), from which the domestic races have been derived, are the principal species. Consult Coues and Allen, ‹Monographs of the Rodentia› (Washington 1877); Stone and Cram, ‹American Animals› (New York 1902); Ingersoll, ‹Life of Mammals› (New York 1906).

HARGRAVES, här'gravz, **Edward Hammond**, English discoverer of the gold-fields of Australia: b. Gosport, England, 1816; d. Sydney, New South Wales, 29 Oct. 1891. When 18 he settled in Australia, but attracted to California in 1849, he there tried his luck as gold-digger, and detecting a similarity in the geological formation of California and Australia, inferred that gold would be found in the latter. On his return to the island continent he established the correctness of his surmise by finding gold on the west slopes of the Blue Hills in New South Wales in 1851. He was appointed commissioner of Crownlands, and received from the government of New South Wales a reward of $50,000. In 1855 he published ‹Australia and Its Goldfields.›

HARGREAVES, här'grēvz, **James**, English inventor: b. Standhill, near Blackburn, Lancashire; d. Nottingham, England, April 1778. In 1760 he invented a machine consisting of a revolving cylinder with cards or combs set round it as a substitute for the hand-cards formerly in use in combing out cotton. Some years after this he invented the spinning-jenny, by which he was able to spin with several spindles at once. With his new machines he succeeded in turning out a much greater amount of yarn than his neighbors, which excited their jealousy, and they accordingly broke into his dwelling and destroyed his machine. In consequence of repeated persecution of this kind Hargreaves removed in 1768 to Nottingham, and in 1770 obtained a patent for his invention. Here, however, he reaped scarcely any more benefit from it than before. After refusing £3,000 offered him by a private company for his patent, this was declared invalid on the ground that he had sold several of the machines before taking out the patent. For the rest of his life he carried on business as a cotton manufacturer in partnership with Mr. James. The only public recognition this invention ever obtained was in the form of a bounty of £250 granted by Sir Robert Peel, nearly 70 years after Hargreaves' death, to his last surviving daughter.

HARING, Wilhelm, vĭl'hĕlm hā'rĭng, «ALEXIS WILIBALD,» German historical novelist: b. Breslau, 29 June 1798; d. Arnstadt, 16 Dec. 1871. His work was suggested by the 'Waverly Novels' and in fact, his first two important works, 'Walladmor' and 'Avalon Castle,' purported to be translations from Scott. His works are historical tales of Prussia, with Frederick the Great for hero: among these may be cited 'Cabanis'; 'The False Waldemar'; 'Peace is the First Civic Duty.' He was very fertile in plot and incident, but his style is mannered; the tales are still popular, however, from their patriotic fervor.

HARIVANSA, hă-rĭ-văn'shạ, a Sanskrit epic poem, later than the Mahâbhârata (q.v.), to which it forms a sort of sequel or epilogue. It has been translated into French by Langlois (1834).

HARK, Joseph Maximilian, Moravian clergyman: b. Philadelphia, 4 June 1849. Graduated from the Moravian College and Theological Seminary in Bethlehem, Pa., he entered the Moravian ministry and was successively pastor of Moravian churches in Lebanon, Philadelphia and Lancaster, Pa. Since 1893 he has been principal of the Moravian Seminary at Bethlehem, Pa., the oldest girls' boarding school in America. He has been a frequent contributor to *The Outlook* and other periodicals, and has published 'The Unity of the Truth in Christianity and Evolution.'

HARKNESS, Albert, American Latinist: b. Menden, Mass., 6 Oct. 1822; d. Providence, R. I., 26 May 1907. He was graduated from Brown University in 1842, and in 1855 was appointed professor of Greek in that institution. He was a founder of the American Philological Association, and its president in 1875–76. In 1884 he was elected director of the American School of Classical Studies at Athens, Greece. His best-known works were a series of Latin textbooks widely used and of much influence; including a first book, readers, a manual of prose composition, editions of Cæsar, Cicero and Sallust, and an excellent 'Latin Grammar' (1881); revised and enlarged as 'A Complete Latin Grammar' (1898).

HARKNESS, William, American astronomer: b. Ecclefechan, Scotland, 17 Dec. 1837; d. 1903. He was graduated from Rochester University in 1858, studied medicine, was a surgeon in the Federal army for a time, in 1862–65 was an aid in the United States Naval Observatory, and during the total eclipse of 7 Aug. 1869 discovered the line K. 1474 of the solar corona. He is best known for his theory of the focal curve of achromatic telescopes, and for his invention of the spherometer caliper, the most nearly accurate device for the measurement of the inequalities of pivots in astronomical instruments. In 1894–99 he was astronomical director of the Naval Observatory, and in 1899 was retired with relative rank of rear-admiral. He published 'The Solar Parallax' (1891).

HARLAN, här'lạn, **James,** American legislator: b. Clarke County, Ill., 25 Aug. 1820; d. Mount Pleasant, Iowa, 5 Oct. 1899. He was graduated at Asbury (now De Pauw) University (Indiana) in 1845, in 1853 was elected president of Iowa Wesleyan University, in 1855–65 served as United States senator, in 1865–66 was Secretary of the Interior, and then served a third term (1866–72) in the Senate. He was a close associate of Abraham Lincoln, and his daughter Mary married Robert T. Lincoln (q.v.). Subsequently he was editor of the Washington *Chronicle* and in 1882–85 presiding judge of the Court of Commissioners of Alabama claims.

HARLAN, John, American physician, Oriental adventurer and ruler: b. Philadelphia. Dr. Harlan sailed from Boston in 1825 as surgeon-apothecary of an East India merchant ship. On arriving in India he found an urgent demand for surgeons to proceed to the first British Burmese campaign. He served through that war, and returned to India. His usefulness being no longer required by the British, much to his chagrin, he went up-country and attached himself to the court of Ranjit Singh, the independent Sikh king of the Punjab. Dr. Harlan soon rose high in Ranjit Singh's favor, and in 1827, was appointed governor of the province of Gujarat, which, with his capital city at Ahmedabad, he ruled until 1836. Over some dispute with Ranjit Singh he resigned that office, and went to Cabul where, as one of the ministers of Dost Mohammed, Amir of Afghanistan, on the outbreak of the war between Afghanistan and Great Britain, Dr. Harlan applied for the position of commander-in-chief of the Afghan army, but it was bestowed upon Ackbar Khan, the Amir's son, Dost Mohammed supposing Harlan to be an Englishman and being distrustful. Though disappointed, Dr. Harlan remained to give the Afghans military advice which, had it been accepted, would have seriously threatened the British force advancing by way of the Bolan Pass. Dr. Harlan again returned to India, where he became the friend and confidant of Sir Henry Lawrence, high commissioner of the Punjab. Much of momentous importance to the future of British interests in India was then transpiring, and Dr. Harlan, tired of the duplicity of native rulers, rendered valuable advice. He is described as having been «a handsome man of fine presence.» Dr. Harlan finally returned to the United States and took up his residence in New York, where he was a conspicuous figure in the late forties. He died about 1850. He was the only American to become a ruler in India and the first to visit Afghanistan. Consult Ireland, J. B., 'From Wall Street to Kashmir' (pp. 46–47, New York 1859).

HARLAN, John Marshall, American jurist: b. Boyle County, Ky., 1 June 1833; d. 1911. He was graduated from Centre College, Kentucky, studied law at Transylvania University, and entering upon the practice of his profession at Frankfort, became county judge in 1858, and was Whig candidate for Congress in 1859, but was not elected. In the Civil War he served in the Union army as colonel of a Kentucky regiment, and in 1863–66 was attorney-general of his State. He was Republican nominee for governor in 1871 and 1875, but was defeated on both occasions. In the Republican National Convention of 1872 his name was presented by the Kentucky delegation for the nomination for Vice-President of the United States. In 1877 he was appointed a member of the commission to investigate the troubles in Louisiana; and in November of that same year he was appointed associate justice of the United States Supreme Court, of which he is considered one of the most able and independent members. He supported the constitutionality of the income tax clause of the Wilson Tariff Bill. In 1893 he was a member of the Bering Sea Tribunal of Arbitration.

HARLAN, Iowa, city, county-seat of Shelby County, on the West Nishnabotna River, the Chicago, Rock Island and Pacific, the Chicago and Northwestern railroads, about 90 miles west of Des Moines. The chief manufactures are foundry products, agricultural implements, flour, bricks, gasoline engines and furniture. Its shipping trade is in agricultural products and the manufactures of the city. It is the seat of the Western Iowa Vocational College. Pop. 2,570.

HARLAND, här′lạnd, **Henry,** pseudonym «SIDNEY LUSKA.» Anglo-American novelist: b. Saint Petersburg, Russia, 1 March 1861; d. San Remo, Italy, 21 Dec. 1905. He was educated at Harvard and after being in the surrogate's office in New York 1883–86 removed to London, where he edited the ‘Yellow Book.’ He published ‘As It Was Written’ (1885), a musician's story; ‘Mrs. Peixada’ (1886); ‘The Land of Love’ (1887); ‘My Uncle Florimond’ (1888); ‘The Yoke of the Thorah’ (1887); ‘Mr. Sonnenschein's Inheritance’ (1888); ‘A Latin-Quarter Courtship’; ‘Comedies and Errors’ (1898); ‘Cardinal's Snuff-box’ (1900); ‘My Friend Prospero’ (1904), etc., books which have been extensively circulated in both America and England.

HARLAND, Marion. See TERHUNE, MARY VIRGINIA.

HARLECH, här′lĕн, Wales, an ancient town, the former capital of Merionethshire, situated on the coast, 10 miles north of Barmouth. On a steep hill overlooking the sea is the castle, which held out for the Lancastrians in the Wars of the Roses and later for Charles I. The ‘March of the Men of Harlech’ commemorates its capture by the Yorkists in 1468.

HARLEM, a part of Manhattan Island, in New York city above 106th street, between the East and Harlem rivers and Eighth avenue. It was anciently Neuw Haarlem and later Haarlem, then Harlem, a town of Westchester County, but is now incorporated in New York city. The extension of the elevated railway and subway systems caused it to become thickly settled as a residential quarter, while its business activities, both commercial and manufacturing, likewise greatly increased, and since 1900 it may be regarded as solidly built up. Its main thoroughfare is 125th street, which is occupied throughout its extent with retail establishments of various kinds. Crosstown car lines run on 125th and 116th streets. Between 124th street on the north, 120th street on the south and Madison and Mount Morris avenues on the east and west, respectively, lies Mount Morris Park, the centre of the old village. The name is now a local designation for all of Manhattan borough north and east of Central Park. The site of the battle of Harlem Heights has been located as about where the Barnard College buildings of Columbia University now stand. Here a small force of Americans repulsed the British. Consult Irving, ‘Knickerbocker's History of New York’; Johnston, ‘The Bank of Harlem Heights’ (1897); Pierce, ‘New Harlem’ (1904).

HARLEM HEIGHTS, Battle of, in the American Revolution. After the battle of Kip's Bay (q.v.) the American troops had been withdrawn to the upper part of Manhattan Island at Harlem Heights. On 16 Sept. 1776 an advance guard of British attacked a detachment of troops under Col. Thomas Knowlton, supported by troops under Maj. Andrew Leitch. The Americans repulsed the British and were recalled from the pursuit with difficulty, but in the battle both Knowlton and Leitch were mortally wounded. The British loss was 70 killed and 200 wounded; the Americans lost 80 killed and wounded. Howe remained inactive for a month, then attacking Washington at White Plains (q.v.) and later capturing Fort Washington (q.v.). Consult accounts by H. P. Johnston, W. R. Shepherd and E. C. Benedict; Johnston, ‘Campaign of 1776’ (pp. 246–262); Carrington, ‘Battles of the Revolution’ (pp. 228–231); Lamb, Martha J., ‘City of New York’ (Vol. II, pp. 128–132).

HARLEM RIVER, the name given to the tidal channel north of the island of Manhattan, which separates the boroughs of Manhattan and the Bronx, in New York city. The Harlem is connected with the Hudson River by Spuyten Duyvil Creek and extends south by east about seven miles to East River. Randall's Island is at its entrance to East River. In 1895 a ship-canal was opened which connects the Hudson and the Harlem south of the Spuyten Duyvil channel. A number of bridges span the Harlem, the finest being High Bridge, an aqueduct bridge, and Washington Bridge, which crosses the river a little north of a point opposite Fort Washington on the Hudson. Along the western shore is the excellent roadway called the Speedway, and on the same side of the river are the polo and ball grounds, the High Bridge Park and a number of fine public and private buildings.

HARLEQUIN, här′lĕ-kĭn or -kwĭn (French, *arlequin*, Italian *arlecchino*), a word of doubtful origin but probably from old French *Hellequin, Herlequin*, the name of a demon figuring in mediæval legends; this again is supposed to be of German origin, its elements corresponding to English «hell» and «kin.» Riccoboni conjectures (‘History of the Italian Theatre’) that the dress of the harlequins is no other than the *centunculus* of the old Roman *mimi* or *mimes*, who were players in ridiculous pieces or farces of a loose character. The character of the ancient harlequin was a mixture of extravagant buffoonery with great bodily agility. But in the middle of the 16th century his character was essentially changed. He became a simple, ignorant servant, who tries very hard to be witty, even at the expense of being malicious. He is a chameleon, who assumes all colors and can be made, in the hands of a skilful actor, the principal character on the stage. He must excel in extempore sallies. This account applies more particularly to the Italian harlequin. The gallant, obsequious French harlequin is an entirely national mask. In the vaudeville theatre he is silent, with a black half-mask and reminds one throughout the representation of the grace and agility of the cat. In Great Britain, in the Christmas pantomimes, he became a lover and a magician; and in exchange for the gift of language, of which he has been deprived, he has been invested with a wonder-working wand. With this wand he protects his mistress, the columbine, against the clown and pantaloon, who pursue and endeavor to capture her, until the pursuit is brought to a termination by a good fairy. The harlequin wears a tight dress of bright colors and glittering with spangles. Consult ‘A History of Pantomimes’ (1901).

HARLEQUIN CABBAGE-BUG. See CABBAGE-INSECTS.

HARLEQUIN DUCK. See DUCK.

HARLEQUIN SNAKE. See CORAL SNAKE.

HARLEY, Robert, 1ST EARL OF OXFORD, English statesman: b. London, 5 Dec. 1661; d. 21 May 1724. After the accession of Anne he and his colleague, Saint John, afterward Lord Bolingbroke, became leaders of the Tories. The former was chosen speaker of the House of Commons in 1702 and was chief Secretary of State 1704–08. After the fall of Marlborough Harley became Chancellor of the Exchequer in 1710 and next year was created Earl of Oxford. He and Bolingbroke secured the Treaty of Utrecht (1713), but afterward quarreled. Early in the reign of George I he was impeached of high treason on the ground of his alleged Jacobite intrigues, and was kept in the Tower for two years, but owing to the inability of the Peers and the Commons to agree about the mode of procedure, was acquitted. His patronage was extended to Swift, Pope and other literary men, and he made a valuable collection of books and MSS., which latter are preserved in the British Museum, where they form the ‘Bibliotheca Harleiana.’ Those which have been printed constitute the ‘Harleian Miscellany.’

HARLOW, här'lō, **George Henry,** English painter: b. London, 10 June 1787; d. there, 4 Feb. 1819. After studying under other masters, he entered the studio of Sir Thomas Lawrence who used to employ him to deaden color. In 1818 he visited Rome, where he astonished the artists there by completing an effective copy of the ‘Transfiguration’ of Raphael in 18 days. He gained the friendship of Canova, who procured his election as a member of the Academy of Saint Luke. His best original works are two designs from Shakespeare, ‘Hubert and Prince Arthur’ and the ‘Trial of Queen Catharine.’ The principal characters in the latter are portraits of members of the Kemble family; and the figure of Queen Catharine is a likeness of Mrs. Siddons (q.v.). He was eminent as a portrait painter, and his portrait of Fuseli is regarded as a work of great merit.

HARLOWE, Clarissa, a novel published by Samuel Richardson in 1748. The story is told by means of letters, and while somewhat prolix for modern taste, is an accurate record of many of the manners and ideals of the 18th century.

HARMALINE and **HARMINE,** two alkaloids which occur, probably in the form of phosphates, in the seed-coatings of the harmel or Syrian rue (*Peganum harmala*), a plant growing in the Mediterranean region and in southern Asia. The seeds are extracted with dilute acetic or sulphuric acid, and the hydrochlorides of the two alkaloids are precipitated by the addition of common salt. The precipitate is washed with salt solution, and afterward with water, in which the hydrochlorides dissolve. The filtrate is clarified by animal charcoal and heated to 140° F., after which ammonia is added. Harmine is precipitated first, and by the continued addition of ammonia the harmaline is thrown down subsequently. Harmine has the formula $C_{13}H_{12}N_2O$. It is practically insoluble in ether, and is but slightly soluble in water. It dissolves in alcohol, from which it crystallizes in colorless monoclinic prisms, melting at 495° F. Harmaline is the hydride of harmine, and has the formula $C_{13}H_{14}N_2O$. It is somewhat soluble in water, ether and cold alcohol, and dissolves freely in hot alcohol. It crystallizes from solution in alcohol in the form of octahedra belonging to the trimetric system, and melts at about 460° F. The salts of harmine are mostly colorless, while those of harmaline are yellow; and the salts of both of these bases exhibit marked fluorescence. The name harmaline is also applied to the coloring matter now more commonly known as fuchsine.

HARMATTAN, här-măt'an, a land-wind, very dry and hot, blowing upon the coast of Africa between Cape Verde, in lat. 14° 43' N., and Cape Lopez, lat. 0° 36' S., during December, January and February. It is generally attended by a peculiar haze, through which the sun shines red. This haze has been analyzed as consisting of minute diatomaceous dust gathered from the interior, and the microscopic fragments of shells injure vegetation and injuriously affect man, drying up the eyes, the mouth, etc., even peeling off the skin. On the other hand, it tends to terminate fever and dysentery, and to mitigate cutaneous diseases. When not bearing this shell-dust the wind is often cool and dry. See SIMOON.

HARMODIUS (här-mō'dĭ-ŭs) and **ARISTOGITON,** ă-rĭs-tō-jī'tŏn, two Athenian youths who in 514 B.C. killed Hipparchus, the younger brother of the tyrant Hippias, partly because of an insult offered to the sister of Harmodius, and partly with a view to the overthrow of the Pisistratidæ. Harmodius was slain by the soldiers of Hipparchus, while Aristogiton fled, but was afterward taken and executed. Subsequently they came to be regarded as patriotic martyrs, and received divine honors from the Athenians, and had statues raised to their memory. They were strongly attached to each other, and are sculptured in a group in the Museo Nazionale, Naples.

HARMON, Daniel Williams, fur trader: b. Vermont, 1778; d. 1845. He entered the service of the North-West Company in 1800, and spent the succeeding 19 years in the far west of British North America. He returned to the East in 1819, bringing with him the diary of his long sojourn, which was published in the succeeding year. He is notable as the first white man to grow crops west of the Rocky Mountains.

HARMON, Judson, American jurist: b. Hamilton County, Ohio, 3 Feb. 1846. He was graduated at Denison University 1866, and at the Cincinnati Law School LL.B. in 1869. Denison in 1891 gave him the honorary degree of LL.D. He practised law in Wyoming, Ohio, and was elected mayor of that city, filling the office 1875–76. From the mayor's office he passed to the bench of the Court of Common Pleas, serving as one of the judges of that court 1876–78 when he was succeeded by William Howard Taft, Republican. His record in the lower court gained for him a seat on the bench of the Superior Court of Cincinnati where he served 1878–99, and on his resignation he was succeeded by Judge Taft. When President Cleveland, on 10 June 1895, appointed Attorney-General Olney his Secretary of State, his choice to fill the vacancy was Judge Harmon. He served as president of the Ohio Bar Association 1897–98. The University of Cincinnati in 1896 offered him the chair of law which he accepted and has since held. On 3 Nov. 1908 he was elected governor of Ohio and served until 1913. He was prominently mentioned for the Democratic nomination for the Presidency of the United States at Baltimore in 1912.

HARMONIC ANALYSIS, The. «The Harmonic Analysis» is the name first given by Thomson and Tait in their 'Natural Philosophy' to a method extensively and fruitfully employed in investigations in many branches of mathematical physics, and first used by Daniel Bernouilli and Euler in the middle of the 18th century in studying the musical vibrations of a stretched elastic string.

From the physical side it is described by J. Clerk Maxwell as «a method by which the solution of an actual problem may be obtained as the sum or resultant of a number of terms, each of which is a solution of a particular case of the problem.» The method is applicable to physical problems where the actual complicated state under investigation can be regarded as due to the superposition of a number of simpler states that can coexist without interfering with one another.

For example, in dealing with the small oscillations of a musical string it is known that the string is capable of sounding a variety of so-called pure notes, known as the fundamental note, the first harmonic or octave of the fundamental note, and the higher harmonics of the fundamental note, and that the forms of vibration giving these various notes may coexist, so that the string may be sounding at once its fundamental note and its various harmonics and thus be giving a note quite distinguishable from its pure fundamental note though of the same pitch. If we are dealing with the problem of the motion of a string sounding such a complicated note, the harmonic analysis enables us to obtain and to express its solution as a sum of the terms expressing the motions which separately would give the separate pure notes actually present.

From the mathematical side the problems to which the harmonic analysis is applicable are those in which it is necessary to find a solution of a homogeneous linear differential equation which shall satisfy a set of given initial or boundary conditions sufficiently numerous to make the problem determinate. It is well known that if a solution of such a differential equation has been obtained, it may be multiplied by any constant and will still be a solution; and that if several solutions have been obtained, their sum will be a solution. In using the harmonic analysis we attempt by a skilful use of these two principles to so combine simple particular solutions of the differential equation involved in the problem as to form a solution of the equation which satisfies all the given conditions. This usually makes it necessary to analyze some one of the given conditions into a sum or series of simpler so-called harmonic terms, or in other words to develop some function of one of the independent variables, or of a set of the independent variables into a series whose terms are of specified form.

For instance, suppose a harp-string of length l initially distorted into a curve whose equation referred to the position of equilibrium of the string as the X-axis and to one end of the string as origin is $y=f(x)$, and then released, and that it is required to solve the problem of the subsequent motion of the string, the initial displacement being small.

Here we have to solve the differential equation

$$\frac{\partial^2 y}{\partial t^2} = a^2 \frac{\partial^2 y}{\partial x^2}, \tag{I}$$

subject to the conditions $y=0$ when $x=0$; $y=0$ when $x=l$; $\frac{\partial y}{\partial t}=0$ when $t=0$; $y=f(x)$ when $t=0$. It is known and is easily verified that $y=\sin \beta x \cos a\beta t$ is a particular solution of (I) if β is any constant. If we take $\beta=\frac{m\pi}{l}$, where m is any whole number, $y=\sin\frac{m\pi x}{l}\cos\frac{m\pi at}{l}$ is a solution of (I) which satisfies our first three conditions; and so is

$$y=a_1 \sin\frac{\pi x}{l}\cos\frac{\pi at}{l} + a_2 \sin\frac{2\pi x}{l}\cos\frac{2\pi at}{l} + a_3 \sin\frac{3\pi x}{l}\cos\frac{3\pi at}{l} + \ldots, \tag{1}$$

where $a_1, a_2, a_3, \ldots$ are any constants When $t=0$ (1) reduces to

$$y=a_1 \sin\frac{\pi x}{l} + a_2 \sin\frac{2\pi x}{l} + a_3 \sin\frac{3\pi x}{l} + \ldots \tag{2}$$

and if we can choose a_1, a_2, etc., so that the series in (2) is equal to $f(x)$ for all values of x between 0 and l, (1) becomes our required solution. This calls for the development of $f(x)$ into a Trigonometric Series of somewhat peculiar form known as a Fourier's Series, and when that is accomplished our solution is complete.

Fourier's Series.— It was first shown by

Fourier in his researches into the Conduction of Heat in 1812 that under certain very general conditions concerning the continuity of f

$$f(x)=\frac{1}{2}b_0+b_1\cos\frac{\pi x}{c}+b_2\cos\frac{2\pi x}{c}+b_3\cos\frac{3\pi x}{c}+\dots$$

$$+a_1\sin\frac{\pi x}{c}+a_2\sin\frac{2\pi x}{c}+a_3\sin\frac{3\pi x}{c}+\dots,\quad(3)$$

where $$a_m=\frac{1}{c}\int_{-c}^{c}f(x)\sin\frac{m\pi x}{c}\,dx,$$

and $$b_m=\frac{1}{c}\int_{-c}^{c}f(x)\cos\frac{m\pi x}{c}\,dx,$$

for all values of x between $-c$ and c.

If $f(-x)=-f(x)$, that is, if $f(x)$ is an odd function, (3) reduces to

$$f(x)=a_1\sin\frac{\pi x}{c}+a_2\sin\frac{2\pi x}{c}+a_3\sin\frac{3\pi x}{c}+\dots,\quad(4)$$

where $$a_m=\frac{2}{c}\int_{0}^{c}f(x)\sin\frac{m\pi x}{c}\,dx.$$

If $f(-x)=f(x)$, that is, if $f(x)$ is an even function, (3) reduces to

$$f(x)=\frac{1}{2}b_0+b_1\cos\frac{\pi x}{c}+b_2\cos\frac{2\pi x}{c}+b_3\cos\frac{3\pi x}{c}+\dots,\quad(5)$$

where $$b_m=\frac{2}{c}\int_{0}^{c}f(x)\cos\frac{m\pi x}{c}\,dx.$$

If the development need hold good merely for values of x between 0 and c, any one of the forms given above may be employed.

Harmonic Functions.— Laplace's Equation,

$$\frac{\partial^2 V}{\partial x^2}+\frac{\partial^2 V}{\partial y^2}+\frac{\partial^2 V}{\partial z^2}=0,\quad(\mathrm{II})$$

in the numerous forms it assumes in different systems of co-ordinates plays a larger part in the various branches of mathematical physics than any other differential equation, and the harmonic analysis is required in a large proportion of the physical problems that obey the law it expresses.

A function which together with its first space derivatives is continuous within a specified region and which satisfies Laplace's equation at every point within the region is said to be *harmonic* in the region in question.

The form to which a harmonic function reduces on one of the level surfaces of the appropriate co-ordinate system is called a *Surface Harmonic.*

Zonal Harmonics.— The coefficient of z^m in the development of $(1-2\mu z+z^2)^{-\frac{1}{2}}$ in ascending powers of z, where $\mu=\cos\theta$, is represented by $P_m(\mu)$ and is called a *Surface Zonal Harmonic* of the mth degree, or a *Legendre's Coefficient* or *Legendrian.*

It can be shown that $V=r^m P_m(\cos\theta)$ and $V=\frac{1}{r^{m+1}}P_m(\cos\theta)$ are particular solutions of Laplace's equation in spherical co-ordinates,

$$\frac{r\partial^2(rV)}{\partial r^2}+\frac{1}{\sin\theta}\frac{\partial\left(\sin\theta\frac{\partial V}{\partial\theta}\right)}{\partial\theta}+\frac{1}{\sin^2\theta}\frac{\partial^2 V}{\partial\phi^2}=0.\quad(\mathrm{III})$$

They are called *Solid Zonal Harmonics.* The first form is harmonic within the sphere whose centre is at the origin of co-ordinates and whose radius is unity, and the second form is harmonic in all space outside of that sphere. They are appropriate functions to use in solving problems where a solution of (III) is required, if it is evident from considerations of symmetry that the solution is independent of the co-ordinate ϕ.

$$P_m(\mu)=\frac{1\cdot3\cdot5\cdot\dots(2m-1)}{1\cdot2\cdot3\cdot\dots m}\left[\mu^m-\frac{m(m-1)}{2(2m-1)}\mu^{m-2}+\frac{m(m-1)(m-2)(m-3)}{2\cdot4\cdot(2m-1)(2m-3)}\mu^{m-4}\dots\right]$$

whence

$P_0(\mu)=1,$ $\quad P_2(\mu)=\frac{1}{2}(3\mu^2-1),$
$P_1(\mu)=\mu,$ $\quad P_3(\mu)=\frac{1}{2}(5\mu^3-3\mu),$
$P_4(\mu)=\frac{1}{8}(35\mu^4-30\mu^2+3),$
$P_5(\mu)=\frac{1}{8}(63\mu^5-70\mu^3+15\mu).$

. . . .

A very important property of the Surface Zonal Harmonic $P_m(\mu)$ which follows readily from its definition is $P_m(1)=1$. That is, the function reduces to unity at all points on the polar axis.

If, in a problem where V must satisfy Laplace's Equation and there is symmetry about the polar axis, the value of V on the axis is represented by a convergent series $a_0+a_1z+a_2z^2+\dots$, z being the distance of the point from the origin, then the series formed by writing $r^mP_m(\cos\theta)$ instead of z^m in the given series gives the value of V at any point in space at which the new series is convergent. If the value of V on the axis is represented by a convergent series $\frac{a_1}{z^1}+\frac{a_2}{z^2}+\frac{a_3}{z^3}+\dots$, then the series formed from the given series by replacing $\frac{1}{z^{m+1}}$ by $\frac{1}{r^{m+1}}P_m(\cos\theta)$ gives the value of V at any point in space at which the new series is convergent.

For instance, if a charge M of statical electricity be placed on a conductor in the form of a thin circular disc of radius a, it is known that the charge will so distribute itself that the surface density σ at any point of the disc at the distance s from its centre will be

$$\sigma=\frac{M}{4a\pi\sqrt{a^2-s^2}}.$$

If the axis of the disc is taken as the polar axis, the value of the Potential Function V due to the charge, at a point of the axis at the distance x from the centre is $V=\frac{M}{2a}\cos^{-1}\left(\frac{x^2-a^2}{x^2+a^2}\right)$. This can be developed into the series

$$\frac{M}{a}\left[\frac{\pi}{2}-\frac{x}{a}+\frac{x^3}{3a^3}-\frac{x^5}{5a^5}+\dots\right]\text{ if } x<a,$$

or $$\frac{M}{a}\left[\frac{a}{x}-\frac{a^3}{3x^3}+\frac{a^5}{5x^5}-\frac{x^7}{7a^7}+\dots\right]\text{ if } x>a.$$

Hence

$$V=\frac{M}{a}\left[\frac{\pi}{2}-\frac{r}{a}P_1(\cos\theta)+\frac{1}{3}\frac{r^3}{a^3}P_3(\cos\theta)-\frac{1}{5}\frac{r^5}{a^5}P_5(\cos\theta)+\dots\right]\text{ if } r<a,\text{ and }\theta<\frac{\pi}{2};$$

and

$$V=\frac{M}{a}\left[\frac{a}{r}-\frac{1}{3}\frac{a^3}{r^3}P_2\,(\cos\theta)+\frac{1}{5}\frac{a^5}{r^5}P_4(\cos\theta)-\ldots\right]$$

if $r>a$.

If, in a problem where V must satisfy Laplace's Equation and there is symmetry about an axis, the value of V on the surface of the sphere $r=a$ is given and can be expressed as a sum or as a series of Surface Zonal Harmonics, the value of V at a point not on the sphere will be obtained by replacing the Surface Zonal Harmonics by the appropriate Solid Zonal Harmonics.

To take a very simple example: If a charge of electricity is placed on a spherical conductor of radius a, it is known that it will so distribute itself that all points on the surface will be at the same potential $\frac{M}{a}$.

Now $\frac{M}{a}=\frac{M}{a}P_0(\cos\theta)$ and is a Surface Zonal Harmonic. Hence any point at the distance r from the centre of the conductor is at potential $\frac{M}{a}\frac{r^0}{a^0}P_0\,(\cos\theta)$ or $\frac{M}{a}$ if $r<a$, and at potential $\frac{M}{a}\,\frac{a}{r}P_0\,(\cos\theta)$ or $\frac{M}{r}$ if $r>a$.

If the value of V on the surface of the sphere had been less simple, say $V=F(\theta)\equiv f(\cos\ \theta)\equiv f(\mu)$, then $f(\mu)$ would have had to be expressed in the form $a_0P_0(\mu)+a_1P_1(\mu)+a_2P_2(\mu)+\ldots$ before we could have used the simple method illustrated above. This can be done by the aid of the formula

$$f(\mu)=a_0P_0(\mu)+a_1P_1(\mu)+a_2P_2(\mu)+a_3P_3(\mu)+\ \ldots,$$

where $a_m=\frac{2m+1}{2}\int_{-1}^{1}f(x)\,P_m(x)dx$, the development in question holding good when $-1<\mu<1$.

For instance, let one-half of the surface of a homogeneous sphere be kept at the temperature zero and the other half at the temperature 1; to find the stationary temperature u of any internal point. Here $f(\mu)=1$, $0<\mu<1$, and $f(\mu)=0$, $-1<\mu<0$. Consequently

$$a_m=\frac{2m+1}{2}\left[\int_{-1}^{0}0\cdot P_m(x)dx+\int_{0}^{1}P_m(x)dx\right]$$

$$=\frac{2m+1}{2}\int_{0}^{1}P_m(x)dx.$$

Letting $m=0, 1, 2, \ldots,$ successively, and using the corresponding values 1, x, $\frac{1}{2}(3x^2-1)$ etc., of $P_m(x)$, we get $a_0=\frac{1}{2}$, $a_1=\frac{3}{4}$, $a_2=0$, $a_3=-\frac{7}{8}\cdot\frac{1}{2}$, $a_4=0$, $a_5=\frac{11}{12}\cdot\frac{1}{2}\cdot\frac{3}{4}$, $\ldots$ and $f(\mu)=\frac{1}{2}P_0(\mu)+\frac{3}{4}P_1(\mu)-\frac{7}{8}\cdot\frac{1}{2}P_3(\mu)+\frac{11}{12}\cdot\frac{1}{2}\cdot\frac{3}{4}P_5(\mu)-\ldots$

If a is the radius of the sphere, the required temperature

$$u=\frac{1}{2}+\frac{3}{4}\frac{r}{a}P_1(\cos\theta)-\frac{7}{8}\cdot\frac{1}{2}\frac{r^3}{a^3}P_3(\cos\theta)$$

$$+\frac{11}{12}\cdot\frac{1}{2}\cdot\frac{3}{4}\frac{r^5}{a^5}P_5(\cos\theta)\ldots$$

Tables giving the numerical values of the Surface Zonal Harmonics have been computed and are accessible, and by their aid numerical results can be obtained in such problems as those we have been considering as readily as if we were using simple trigonometric functions. The following is such a table carried only to three places.

TABLE I.—SURFACE ZONAL HARMONICS.

θ	$P_1(\cos\theta)$	$P_2(\cos\theta)$	$P_3(\cos\theta)$	$P_4(\cos\theta)$	$P_5(\cos\theta)$
0°	1.000	1.000	1.000	1.000	1.000
10	.985	.955	.911	.853	.784
20	.940	.824	.665	.475	.272
30	.866	.625	.325	.023	—.223
40	.766	.380	—.025	—.319	—.420
50	.643	.120	—.300	—.428	—.254
60	.500	—.125	—.438	—.289	.090
70	.342	—.324	—.413	—.004	.328
80	.174	—.455	—.247	.266	.281
90	.000	—.500	.000	.375	.000

Legendrians were first used by the Legendre in a paper published in 1785 on the attraction of solids of revolution.

Laplace's Coefficients.— $P_m(\cos\ \gamma)$, where $\cos\gamma\equiv\cos\theta\cos\theta_1+\sin\theta,\sin\theta_1\cos(\phi-\phi_1)$, and is the angle made by the radius vector with a fixed line through the origin whose direction is given by the angles θ_1 and ϕ_1, is called a Laplace's Coefficient or Laplacian, the fixed line being called the Axis and its intersection with the unit sphere the Pole of the Laplacian. A Surface Zonal Harmonic $P_m(\cos\theta)$ is merely a Laplacian whose axis coincides with the axis of co-ordinates. $r^mP_m(\cos\gamma)$ and $\frac{1}{r^{m+1}}P_m(\cos\gamma)$ are solutions of Laplace's Equation (III). The first is harmonic within and the second without the unit sphere.

Laplacians may be used in problems symmetrical about an axis if the axis does not coincide with the axis of co-ordinates just as Zonal Harmonics are used when the problem is symmetrical about the polar axis.

Laplacians were first used by Laplace, in one of the most remarkable memoirs ever written, in determining the attraction of a Spheroid. The paper in question was published in 1782.

Spherical Harmonics.—A Surface Spherical Harmonic of the mth degree Y_m may be most simply defined as the function obtained by dividing a rational, integral, homogeneous, algebraic polynomial of the mth degree in x, y, z with satisfies Laplace's Equation (I), by r^m, that is, by $(x^2+y^2+z^2)^{\frac{m}{2}}$. For example, $\frac{1}{r}(x+y+z)$, $\frac{1}{r^2}(x^2+xy+y^2)$, $\frac{1}{r^3}(2x^3-3xy^2-3xz^2)$ are Surface Spherical Harmonics of the first degree, of the second degree and of the third degree, respectively.

It is clear that r^mY_m satisfies Laplace's Equation. The same thing can be shown of $\frac{1}{r^m+Y_m}$. The first is harmonic within, the second without, the unit sphere. They are known as Solid Spherical Harmonics.

It is clear that if the value of V on the surface of a sphere whose centre is the origin can be expressed as a sum of terms each of which is a surface Spherical Harmonic, its value at any point not on the surface is the sum of the appropriate corresponding Solid Spherical Harmonics.

It can be shown by transforming from spherical to rectangular co-ordinates that the Surface Zonal Harmonic $P_m(\mu)$ or $P_m(\cos\theta)$ and the Laplacian $P_m(\cos\gamma)$ are Surface Spherical Harmonics, and by the reverse transformation that the general Surface Spherical Harmonic Y_m can be formulated as

$$Y_m = A_o P_m(\mu) + \sum_{n=1}^{n=m}\left[(A_n\cos n\phi + B_n\sin n\phi)\sin^n\theta\,\frac{d^nP_m(\mu)}{d\mu^n}\right].$$

A function given arbitrarily on the surface of the unit sphere, i.e., a function of θ and ϕ if expressed as a function of $\cos\theta$ and ϕ can be developed into a series of Surface Spherical Harmonics by the formulas

$$f(\mu,\phi)=\sum_{m=0}^{m=\infty}\left\{A_{o,m}P_m(\mu)+\sum_{n=1}^{n=m}\left[(A_{n,m}\cos n\phi + B_{n,m}\sin n\phi)\sin^n\theta\,\frac{d^nP_m(\mu)}{d\mu^n}\right]\right\},$$

$$A_{o,m}=\frac{2m+1}{4\pi}\int_0^{2\pi}d\phi\int_{-1}^{1}f(\mu,\phi)P_m(\mu)d\mu,$$

$$\frac{2\pi}{2m+1}\,\frac{(m+n)!}{(m-n)!}A_{n,m} = \int_0^{2\pi}\int_{-1}^{1}f(\mu,\phi)\cos n\phi\,\sin^n\theta\,\frac{d^nP_m(\mu)}{d\mu^n}\,d\mu$$

$$\frac{2\pi}{2m+1}\,\frac{(m+n)!}{(m-n)!}B_{n,m} = \int_0^{2\pi}d\phi\int_{-1}^{1}f(\mu,\phi)\sin n\phi\,\sin^n\theta\,\frac{d^nP_m(\mu)}{d\mu^n}\,d\mu$$

The following theorems concerning the integration of Spherical Harmonics are important. We give them without proof.

The integral of the product of two Surface Spherical Harmonics Y_mY_n of different degrees taken over the surface of the unit sphere is equal to zero.

The integral over the surface of the unit sphere, of the product of a Surface Spherical Harmonic by a Laplacian of the same degree, $\frac{4\pi}{2m+1}$ multiplied by the value the Spherical Harmonic assumes at the Pole of the Laplacian.

These theorems enable us to solve many problems in the theory of Gravitation and the theory of Electrostatics by direct integration.

Bessel's Functions.—A Bessel's Function or Surface Cylindrical Harmonic of the nth order $J_n(x)$ may be defined as the coefficient of z^n in the development of $e^{\frac{x}{2}\left(z+\frac{1}{z}\right)}$ into an ascending Power Series in z. It can be shown that

$$V=\cosh(\mu z)\,(A\cos n\phi + B\sin n\phi)J_n(\mu r)$$

and

$$V=\sinh(\mu z)\,(A\cos n\phi + B\sin n\phi)J_n(\mu r),$$

where μ is any constant, are solutions of Laplace's Equation in Cylindrical Co-ordinates

$$\frac{\partial^2V}{\partial r^2}+\frac{1}{r}\frac{\partial V}{\partial r}+\frac{1}{r^2}\frac{\partial^2V}{\partial\phi^2}+\frac{\partial^2V}{\partial z^2}=0. \qquad \text{(IV)}$$

The Bessel's Functions most used are $J_0(x)$ and $J_1(x)$, which are appropriate when the problem has axial symmetry about the Axis of Z.

$$J_0(x)=1-\frac{x^2}{2^2}+\frac{x^4}{2^2\cdot4^2}-\frac{x^6}{2^2\cdot4^2\cdot6^2}+\ldots,$$

and is convergent for all values of x.

$$J_1(x) = -\frac{dJ_0(x)}{dx}.$$

Important properties are given by the formulas

$$\int_0^x xJ_0(x)dx = xJ_1(x)$$

and

$$\int_0^x x\{J_0(x)\}^2dx = \tfrac{1}{2}x^2[\{J_0(x)\}^2 + \{J_1(x)\}^2],$$

and the following formulas for development in Cylindrical Harmonic Series, the development holding good for values of r between o and a.

$$f(r) = \Sigma A_\kappa J_0(\mu_\kappa r),$$

where μ_κ is a root of the transcendental equation in μ, $J_0(\mu a)=0$, or of $J_1(\mu a)=0$, or of

$$\mu aJ_1(\mu a) - \lambda J_0(\mu a) = 0,$$

and

$$A_\kappa=\frac{2}{a^2[\{J_0(\mu_\kappa a)\}^2+\{J_1(\mu_\kappa a)\}^2]}\int_0^a rf(r)J_0(\mu_\kappa r)dr.$$

For the important case where $f(r)=1$,

$$A_\kappa=\frac{2}{\mu_\kappa a[\{J_0(\mu_\kappa a)\}^2+\{J_1(\mu_\kappa a)\}^2]}J_1(\mu_\kappa a).$$

As an example in the use of Bessel's Functions let us find the stationary temperature of any point (r, z) in a homogeneous cylinder of radius a and altitude b if the convex surface and one base are kept at the temperature zero and the other base at the temperature 1.

Here we seek a solution V of equation (IV) which reduces to zero when $z=0$, and when $r=a$, and to 1 when $z=b$. By the aid of the formulas above this is easily formed and is

$$V=\frac{2}{\mu_1aJ_1(\mu_1a)}\,\frac{\sinh(\mu_1z)}{\sinh(\mu_1b)}J_0(\mu_1r) + \frac{2}{\mu_2aJ_1(\mu_2a)}\,\frac{\sinh(\mu_2z)}{\sinh(\mu_2b)}J_0(\mu_2r) + \frac{2}{\mu_3aJ_1(\mu_3a)}\,\frac{\sinh(\mu_3z)}{\sinh(\mu_3b)}J_0(\mu_3r) + \ldots$$

If numerical results are desired, tables for $J_0(x)$ and $J_1(x)$ are needed. Such tables have been computed and are accessible. We give here a small three-place one.

TABLE II.—BESSEL'S FUNCTIONS.

x	$J_0(x)$	$J_1(x)$	x	$J_0(x)$	$J_1(x)$
0.0	1.000	0.000	5.0	—.178	—.328
0.5	.938	.242	5.5	—.007	—.341
1.0	.765	.440	6.0	.151	—.277
1.5	.512	.558	6.5	.260	—.154
2.0	.224	.577	7.0	.300	—.005
2.5	—.048	.497	7.5	.266	.135
3.0	—.260	.339	8.0	.172	.235
3.5	—.380	.137	8.5	.042	.273
4.0	—.397	—.066	9.0	—.090	.245
4.5	—.320	—.231	9.5	—.194	.161
5.0	—.178	—.328	10.0	—.246	.044

TABLE III.—ROOTS OF BESSEL'S FUNCTIONS.

n	x_n for $J_0(x_n)=0$	x_n for $J_1(x_n)=0$
1....................	2.405	3.832
2....................	5.520	7.016
3....................	8.654	10.173

Bessel's Functions of the zeroth order were first used successfully in the Harmonic Analysis by Fourier in 1812, in dealing with the flow of heat in a right circular cylinder.

Other more complicated Harmonic Functions are Lamé's Functions or Ellipsoidal Harmonics, Conal Harmonics, Toroidal Harmonics, etc. Each set is adapted to dealing with Laplace's Equation expressed in a suitable system of Curvilinear Co-ordinates.

Bibliography.— For general treatises on the Harmonic Analysis and on the Harmonic Functions the reader is referred to Heine, ‹Handbuch der Kugelfunktionen› (2d ed., 1878); Todhunter, ‹The Functions of Laplace, Lamé and Bessel› (1875); Thomson and Tait, ‹Natural Philosophy› (Appendix B, 1879); Ferrers, ‹Spherical Harmonics› (1881); Byerly, ‹Fourier's Series, and Spherical Harmonics› (1895); Gray and Matthews, ‹Bessel's Functions› (1895). An excellent account of the history of the subject with detailed references to the early papers, memoirs and other publications, prepared by Prof. M. Bôcher, will be found at the end of Byerly's above-mentioned treatise. For the contemporary literature consult the recent volumes of the ‹Jahrbuch über die Fortschritte der Mathematik› under the heading Kugelfunktionen und verwandte Funktionen. Consult also the ‹Enzyklopädie der Mathematischen Wissenschaften.›

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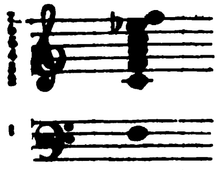
HARMONIC SERIES. See Series.

HARMONICA, a musical instrument invented by Benjamin Franklin in 1762. It is formed of a number of glasses of water, and is played by touching them with the dampened finger. The less the quantity of water, the lower the tone of the scale. The name is also applied to a small wind instrument, or mouth-organ, which has a series of holes to conduct the breath to free reeds, like those of an accordion.

HARMONICON, a chemical apparatus consisting of an open glass tube, the air in which may be made to give a sound resembling a musical note, when held over burning hydrogen. The note depends upon the size of the flame and the length of the tube.



HARMONICS, the accessory or collateral sounds accompanying the primary, fundamental or predominant note of any string, pipe or other sonorous body, and constituting in varying degrees what in English is known as «quality,» in French as «timbre» and in German as «Klangfarbe.» No purely simple sound — one whose vibrations are all in the same period — is producible. When a sound is produced by the vibration of an open string, the whole string vibrates as a unity, giving rise to a tone called the fundamental. The string, however, further divided into various sections, which vibrate separately and more rapidly and produce sounds — the harmonics — differing from the fundamental, but bearing certain fixed proportions to it. By whatever vibrating body a musical sound is evoked harmonics also are produced; and although some of the harmonics are suppressed by modifying circumstances, some are always present. There is a regular succession of intervals in which the harmonics naturally accompany a fundamental sound, which is represented in the following scale of vibrations: 1, 2, 3, 4, 5, 6, 7, etc. These also are the intervals which produce the successive chords in harmony, although the natural harmonics when produced further go beyond the range of harmony which human ears can recognize or musical instruments produce at the will of the performer. (See illustration). 1 is the interval of the octave; 2 is the fifth; 3 is the fourth; 4 is the major third; 5 the minor third; from 6 to 7 is already beyond the range of production on a keyed instrument, but is recognized by musicians as the complement of a four-part simple chord, and is represented approximately on the pianoforte, by E flat, for example, for the key of F.

A musical tone, then, is always complex, but the harmony which attends it is not always the same. The different structure of different instruments suppresses now some, now others, of the succession of harmonics, and a different body of tone is thus produced, distinguishing a note in one instrument from the same note in another. Hence the distinctive construction of the pianoforte in which dissonant harmonics are suppressed, and on the other hand, the use in the organ of mutation and mixture stops — the thirteenths and fifteenths — whereby the consonant harmonics of a given tone are much emphasized. Again, many of the higher harmonics are strongly dissonant both with the fundamental tone and with each other, whence arises the discordant quality of such instruments for instance as the cymbals. Harmonics are also called «overtones,» and all the primary and secondary tones constituting an actual tone are frequently termed «partials» or «partial tones,» the fundamental tone being the first partial, and the harmonics, the upper partials. See Harmony.

HARMONICS, Spherical. See Harmonic Analysis.

HARMONIES OF ECONOMICS. The theory that individual interests consciously pursued as such are naturally harmonious was early suggested by many writers, but it was first definitely stated by Henry C. Carey in America and Frederic Bastiat in France, two writers whose works appeared within a year of each other, and whose conflicting claims to originality have never been satisfactorily decided. They sharply antagonize the English school, especially as represented by Ricards and Malthus. The most important of those conclusions to which exception is taken are summed up by Bastiat in his ‹Harmonies Économiques› (1850). (1) The Theory of Value. While claiming that value originates in labor, they had agreed in attributing value to natural agents, including land, on which no labor had been expended. These goods, which had cost nothing, were none the less appropriated and made to command for their owners the labor of other men. This was characterized by Bastiat as «evident injustice.» (2) The Ricardian Theory of Rent, according to which the price of the products of the soil is determined by the labor needed to produce them on the least productive soils in cultivation. The excess produced on the more productive soils goes to the landowner as rent and increases in absolute and relative amount as the poorer lands are called into cultivation. The result of this law is stated thus: «Increasing opulence for men of leisure; increasing misery for men of toil; in a word, foreordained inequality.» (3) The Malthusian Theory of Population. Population tends to increase more rapidly than subsistence, and this tendency, so disastrous to well-being, can be counteracted only by self-control, which «no one thinks of,» or by vice, misery, war, pestilence, famine, etc. The conclusion of this law is stated as «inevitable pauperism.» Against these Bastiat undertakes to prove that value is due wholly to labor, or more exactly to services rendered to one person by another, that natural agents as such are not and cannot be appropriated; that land values represent only the labor which would be necessary with present methods to bring land from a wild to a productive state, that the return to capital increases absolutely but decreases relatively as capital is increased in amount, that the return to labor increases both relatively and absolutely as capital increases, that «other things being equal, the increasing density of population is matched by an increasing facility of production.» This «theory of harmony» promises increasing prosperity to all the factors of production on one condition on which Bastiat insists — namely, *liberty*. Since self-interest when pursued ever so eagerly, or with ever so great an indifference to other men's interests, works good to all, all interference with its action is necessarily detrimental. The state should absolutely limit its function to the maintenance of justice. Laws restricting the exchange of commodities or otherwise interfering with industrial liberty under pretext of securing harmony of interests are not only destructive to that harmony which can only coexist with liberty, but they are a violation of natural right. Bastiat is, of course, a champion of the doctrine of *laissez-faire*. The wide divergence of Bastiat's theory of harmony and the facts of life suggests the fundamental fallacy of his system. It rests upon a false theory of nature. Carey in 'Harmony of Interests' (1849) agrees with Bastiat, but unlike the Frenchman, he made use of arguments from real life. He advocated state intervention and became an expounder of the doctrine of protection. Neither writer has had disciples of note, though extensive use has of course been made of their arguments. Consult Ingram, 'History of Political Economy'; Walker, 'Land and Its Rent'; Böhm-Bawerk, 'Capital and Interest'; and Lassalle, 'Bastiat, Schulze von Delitzsch.'

HARMONIES ÉCONOMIQUES. See HARMONIES OF ECONOMICS.

HARMONISTS, also called RAPPISTS and ECONOMITES, a religious-socialistic community founded in 1787 by George Rapp (1757–1847), a German of Württemberg. The peaceable and spiritual tenets of the organization aroused antagonism and persecution, and in 1803 they emigrated to America, settling in the Connoquenessing Valley, where the Harmony Society was established on a working basis. By 1805 houses, churches, mills and manufactories had been built, and the settlement had a population of 750 persons. In 1815 they removed to Posey County, Ind., where they founded New Harmony (q.v.); 10 years later, however, they returned to Pennsylvania, and built the township of Economy, in Beaver County, on the Ohio, 20 miles north of Pittsburgh. In 1832, a German adventurer, Bernhard Müller, settling among them, caused dissensions and a split in the society; a separation and apportionment of the property was agreed upon, and 250 members retired. They held all property in common, believed in the second coming of Christ, the near advent of the millennium and practised celibacy. As a result of the latter condition, the membership in 1902 was reduced to eight, and the valuable estate will pass finally into the hands of the last survivor. Consult Hinds, 'American Communities' (1902); Nordhoff, 'The Communistic Societies of the United States' (1874).

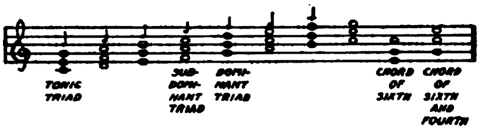
HARMONIUM, a modern musical instrument which produces sounds resembling those of the organ. The invention is ascribed to Alexandre Debain of Paris; but he has at the most merely the credit of perfecting an instrument previously known, called the *orgue expressif,* a kind of organ furnished with an apparatus of free vibrating reeds, intended to increase or diminish the intensity and volume of the sound, by regulating the pressure of the wind, by the aid of which the sounds were produced. The instrument has a keyboard like that of a piano, and when one of the keys is pressed down a valve is opened, which allows the wind from the bellows to rush through one of the wind-boxes and act on the vibrator. There are also several stops, like organ stops, by means of which the performer can direct the stream of wind into the wind-boxes, which produce a flute, clarinet or any other sound, according to the number of stops which the instrument possesses. Such is the harmonium which was patented by Debain in 1840, but since that time various other improvements of more or less value have been made. The chief of these are the addition of a knee action, which either serves as an expression stop, or brings all the stops of the instrument into play at once, and what is called the percussion action, the invention of Kaufmann of Dresden, which consists in the application of a small hammer, which strikes the vibrator as soon as the key is pressed down, and thus aids the action of the wind.

HARMONY, David Buttz, Rear-Admiral, United States navy: b. Easton, Pa., 3 Sept. 1832; d. Washington 2 Nov. 1917. He was graduated at the United States Naval College, and at the age of 85 was the oldest graduate living. From acting midshipman in 1847 he rose through the ranks to that of rear-admiral in 1889. He was executive officer of the *Iroquoisat* in the early stage of the Civil War, taking part in the bombardment and passage of forts Jackson and Saint Philip; Chalmette batteries; capture of New Orleans, Vicksburg and Charleston. With the West blockading squadron he commanded the *Tahoma* and *Sebago,* and was present at the capture of Mobile. After the war he commanded several ships, including the old *Kearsarge* and *Portsmouth,* served at the New York navy yard 1865–67 and again 1869–72; was chief of the Naval Bureau of Yards and

Docks and chairman of the Lighthouse Board. He was commander-in-chief of the Asiatic station 1892–93, and was retired 26 June 1893.

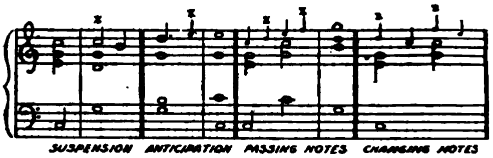
HARMONY. Harmony is the branch of musical theory which treats of the simultaneous combination of tones into chords and the successive interlinking of chords. It may appropriately be styled the grammar of music.

The traditional presentation of the subject begins with an explanation of intervals. An interval is formed whenever two tones are simultaneously combined. Thus C and the adjoining D make an interval of a second, C and E of a third. When three tones are combined we have a triad. Normally a triad consists of the fundamental tone together with its third and fifth. C E G is an example. Every tone in the scale has its triad, as is shown in the whole notes of the illustration (which is here confined to the major scale).



The most important triads are those on the first, fourth and fifth degrees. They are designated respectively as the tonic, subdominant and dominant triads. At the end of the example there are three different forms of the same chord, the difference depending on the tone which occupies the lowest position. The third last is the chord in its fundamental form, the next is the chord of the «sixth,» the last the chord of the «sixth and fourth.» The upper voices, too, like the lowest, may be shifted about, as well as spread apart (open position), but there are no special names for the resulting chord-formations. By adding another third above the highest tone of the normal triad (quarter notes of the example), we obtain a chord of the seventh. Every triad in the scale has its corresponding chord of the seventh, but the most important is that which is built on the dominant, and which is consequently styled the dominant chord of the seventh. The addition of still further notes gives rise to chords of the 9th, 11th and 13th. These, however, are not recognized by all theorists as independent formations.

The fundamental chords adduced may be subjected to numerous alterations and modifications. One or more tones may be raised or lowered chromatically, thus giving rise to «altered» chords. Foreign elements may be introduced into the chords or interspersed between them. There may be suspensions and anticipations, passing and changing notes, pedal points and stationary voices. A suspension is a tone which hangs over, or is «suspended,» from a previous chord. An anticipation is one which reaches forward into the next chord. Changing notes are foreign notes entering abruptly into a harmony, like unprepared suspensions; passing notes fill in the spaces between successive harmonic tones. Pedal points are sustained or recurring tones in the bass accompanying decided changes of harmony above, stationary voices are the same thing when the sustained tones are in the upper parts. Modulation, finally, refers to the transition from one key to another, and completes the basic operations on which harmonic progressions depend.



As to the particular rules governing harmonic progressions, it is of course impossible to go into their details, involving — as it would — a great number of illustrative examples. Suffice it to have pointed out the nature of the material involved. The system in which this material comes to view, and which we have just sketched, is admirably neat and clear, and has served its purpose well. It must not be supposed, however, that it is the only conceivable system, or that others have not been proposed. Riemann, for example, has worked out one which is certainly original, even though it may not win our complete assent. In the ordinary system harmonies are conceived as built up from below, the lowest tone serving as generator of the others. This seems to be in agreement with natural laws. For according to acoustics, the two upper tones of the major triad and the three upper tones of the dominant seventh chord are contained in the lowest tone as partials. Riemann follows the ordinary practice with reference to major chords, but when he comes to the minor he reverses it, *i. e.*, he builds them downward from above. Acoustically he bases his procedure on the supposed existence of «undertones.» With reference to his classification of harmonies, likewise, he deviates widely from the ordinary view. Thus he regards the triad on the seventh degree of the scale (B in our example), as an abbreviated dominant seventh chord, with the lowest tone (G) missing. And he considers the chord of the sixth and fourth as a fundamenal or first-position triad, with a suspension in the two upper voices. Alfred Day likewise admits elliptical chords, *e. g.*, in the case of the seventh chord on the second degree of the scale (D in our example). He conceives this as a chord of the 11th, with the lower B and G omitted. Another interesting idea of his is that according to which some chords have double roots, which is tantamount to saying that they are composed of fragments of two chords. A valuable suggestion, indeed, of which — strange to say — little use has been made. The combination of parts into new wholes is a phenomenon to be observed everywhere. Thus the centaur combines the head and chest of a man with the lower parts of a horse; the word «shan't» is composed of portions of the words «shall» and «not.» What more natural, accordingly, than that music, with its wealth of material, should make use of similar abbreviations and combinations? It would be out of place, however, to follow up this suggestion, as the function of the present review is to give a summary of existing opinions, rather than to develop new ones.

Historically, both the practice and theory of harmony are of comparatively recent development. The simple chords which make up the bulk of ordinary modern music were preceded by something far more complicated. After being confined from time immemorial to the progression of a single voice, music, from the 9th century on, began to spread out into the simultaneous movement of several parts, the result finally being the complicated tissue of polyphonic music which we meet with in the Netherlands and Italy previous to the 17th century. Not until this time do the chance harmonies of simultaneously progressing voices become consolidated into single, block-like chords. The first premeditated use of chords in the modern sense seems to have been made by the founders of opera, who lived about the year 1600, and especially by Monteverde, who stands out as one of the most gifted of this enthusiastic group of men. Theoretically the rules of harmony were first laid down by Rameau in his «Traité de l'Harmonie,» published in the year 1722. It was Rameau who deduced the chords which were the object of his research from the overtones of their root-notes. Tartini, on the other hand, invoked the so-called «combinational» tones for the elaboration of his theories. Not until the time of Helmholtz was the true significance of these discoveries brought to light and given a scientific foundation. Like all other branches of knowledge, harmony has been undergoing changes with the lapse of time and transformation of musical taste. No art is subject to such variations as music in what is considered novel and beautiful. Hence its theory, likewise, has been subject to corresponding fluctuations. To give but a single example, the parallel progression of fifths and octaves, which in the earliest days of harmonic development was the rule, was later forbidden as a deadly offense against the canons of good taste, and remained so for many centuries. Of late, however, this rule has lost much of its rigor, and parallel fifths and octaves are now used again with comparative freedom. Here, as in other arts, the genius of great creative minds has fashioned new modes of expression, and traditional formulas have been powerless to resist. Hence harmony is a fluid branch of theory; and while some of its rules, based on scientific laws of sound, may remain constant, others will be transformed so as to agree with the varying practice of great musicians.

Albert Gehring,
Author of ‘The Basis of Musical Pleasure,’ etc.

HARMONY OF THE SPHERES, a hypothesis of Pythagoras and his school, according to which the motions of the heavenly bodies produced a music imperceptible by the ears of mortals. He supposed these motions to conform to certain fixed laws, which could be expressed in numbers, corresponding to the numbers which give the harmony of sounds.

HARMOTOME, här'mō-tōm, a mineral of the zeolite family; a hydrous silicate of aluminum and barium, invariably occurring in twin crystals of various colors from white to red-brown.

HARMSWORTH, Alfred Charles William. See Northcliffe, 1st Baron.

HARNACK, här'näk, **Adolf**, German theologian: b. Dorpat, Russia, 7 May 1851. He began his studies in his native town in 1869 and in 1874 took up his residence at Leipzig, was made professor extraordinary there in 1876, and professor of theology, first at Giessen in 1879, and eventually at Berlin 1889. In 1890 he was made a member of the Academy of Sciences, Berlin. He has been a prolific writer, both in theology and church history. The distinctive notes of his teaching,— freedom in criticism, distrust of speculative theology and acceptance of Christianity as a life rather than as a system of dogma,— have aroused violent opposition among conservative theologians, but their influence has penetrated far beyond the bounds of Germany. Among his works are ‘Die Ueberlieferung und der Bestand der altchristlichen Litteratur’ (1893); ‘Texte und Untersuchungen’ (1882–94); ‘Martin Luther’ (1901); ‘Das Mönchtum’ (1881); ‘Geschichte’ (1893); ‘Chronologie der altchristlichen Litteratur Cis Eusebius’ (1904); ‘Das Wesen des Christentums’ (1900); ‘Das Apostolische Glaubensbekentniss’ (1897); ‘Die Mission und Ausbreitung des Christentaums’ (1902); ‘Essays on the Social Gospel’ (1907); ‘Bible Readings in the Early Church’ (1912).

HARNESSED ANTELOPES. See Bushbuck.

HARNETT, Cornelius, American statesman: b. England, 20 April 1723; d. North Carolina, 1781. He came in early life to America, and was one of the earliest to denounce the Stamp Act and kindred measures. In 1770–71 he was representative of Wilmington, N. C., in the provincial assembly, and chairman of the most important committees of that body. In 1772 he was appointed, with Robert Howe and Maurice Moore, to prepare a remonstrance against the appointment, by the royal governor Martin, of commissioners to fix the southern boundary of the province. Josiah Quincy, who visited him in 1773, called him «the Samuel Adams of North Carolina»; and, as the Revolution approached, he was its master spirit throughout the Cape Fear region. He was elected to the Provincial Congress in 1775, and drew up the instructions to the North Carolina delegates in the Continental Congress. When in 1776 Sir Henry Clinton appeared with a British fleet off Cape Fear, Harnett and Howe were excepted, as arch-rebels, from the terms of a general pardon. As member of the Continental Congress he signed the Articles of Confederation. When in 1780–81 the British held possession of the country around Cape Fear, Harnett was made prisoner, and died while a captive.

HARNEY, John Hopkins, American journalist: b. Bourbon County, Ky., 1806; d. 1867. He was educated at Oxford University, Ohio, became professor of mathematics at the University of Indiana and at Hanover College, and was president of a college at Louisville, Ky. He was for a number of years editor of the Louisville *Democrat*, a paper which took a radical attitude during the Civil War.

HARNEY, William Selby, American soldier: b. Haysboro, Tenn., 27 Aug. 1800; d. 9 May 1889. He entered the army in 1818; served as colonel in the Mexican War and was brevetted brigadier-general for gallantry at Cerro Gordo, and promoted to that rank in 1858. While commanding the Department of Oregon, in 1859 he took possession of the island of San Juan, which was claimed by the English government. He was in consequence recalled. He retired in 1863 and was brevetted major-general in 1865.

HARNEY'S PEAK, the highest point of the Black Hills, South Dakota, named in honor of Gen. W. S. Harney; height 7,215 feet.

HARO ISLANDS. See San Juan Islands.

HAROLD I, surnamed Harefoot, king of England: d. Oxford, 17 March 1040. He succeeded his father Canute in 1035, notwithstanding a previous agreement that the sovereignty of England should descend to the issue of Canute by his second wife, the Norman Princess Emma. Hardecanute, who was about to invade England at the time of Harold's death, dug up his body and beheaded it. Consult Freeman, 'The Norman Conquest' (Vol. I).

HAROLD II, king of England, second son of Godwin, Earl of Kent: b. about 1022; d. Senlac, near Hastings, Sussex, 14 Oct. 1066. On his father's death in 1053 he succeeded him in the earldom of Wessex and other great offices, and upon the death of Edward the Confessor, 5 Jan. 1066, who had named him his successor, he was chosen king by the nobles, notwithstanding the claim of Edgar Atheling, or the asserted bequest of Edward in favor of William, Duke of Normandy. The latter called upon him to resign the crown, and upon his refusal prepared for invasion. He also instigated Harold's brother, Tostig, to invade the northern coasts of England in conjunction with the king of Norway. The united fleet of these chiefs sailed up the Humber and landed a numerous body of men, who defeated the opposing forces of the earl of Northumberland and Mercia; but at Stamford Bridge, on the river Derwent, in Yorkshire, were totally routed by Harold, whose brother Tostig fell in the battle. A day or two later he heard of the landing of the Duke of Normandy at Pevensey, in Sussex. Hastening southward with all the troops he could muster, a general engagement ensued at Senlac, near Hastings, in which Harold was slain with an arrow, and the crown of England was passed to William. (See Senlac). Consult Freeman, 'The Norman Conquest' (Vols. II and III); Tennyson, 'Harold' (1876).

HAROLD, or HARALD I, surnamed Haarfager (Fair-haired), king of Norway, son of Halfdan the Black: d. Tronjhem, 933. He succeeded to the throne in 860. While he reduced the lesser kings he left them with the title jarl, the administration of their territories and the third part of their income; but many of them emigrated and founded Norwegian colonies. Hrlof or Rollo emigrated to Neustria (France). Others, with their followers, established themselves in Iceland, the Shetland Isles, the Faroes and the Orkneys, then uninhabited. When Harold found that the emigrants often extended their incursions into his dominions he embarked with a naval force to subdue them, conquered the Orkneys, etc., and returned.

HAROLD, or HARALD III, surnamed Haardrada, king of Norway: d. Stamford Bridge, England, 25 Sept. 1066. The date of his birth is unknown. During a great part of his youth and prime he served in the Imperial bodyguard at Byzantium, returning to Norway about 1045. He persuaded his nephew Magnus to divide the supreme power with him, in return for a share of his treasures, and two years later (1047) his nephew died, when he himself became sole king of Norway. In 1066 he joined Tostig, the brother of Harold II (q.v.) of England, in an invasion of that country, having been promised half of it in case of success; but he was slain at the battle of Stamford Bridge.

HAROUN-AL-RASHID. See Harun-al-Rashid.

HARP, the oldest of stringed instruments. The Bible mentions Jubal as the inventor. It has been used by all nations in one form or another. The modern instrument is nearly triangular and the strings are extended from the upper part to one of the sides. It stands erect, and is played with both hands, the strings being struck or pulled with both fingers and thumbs. The improvements which have rendered the modern harp an efficient musical instrument are due to Sebastian Erard, who in 1794 took out a patent for a harp with seven pedals, and again in 1808 for a double-action harp with the same number of pedals, each of which effects two changes in the pitch of the strings. The harp thus constructed contains 43 strings tuned according to the diatonic scale, every eighth string being a replicate in another octave of the one counted from. Various improvements over Erard's harp were made during the 19th century.

HARP, or SADDLEBACK, SEAL. See Seals.

HARP-SHELL, a genus (*Harpa*) of gasteropodous mollusks of the whelk family (*Buccinidæ*), having the last whorl of the shell large, and covered with numerous sharp smooth ribs, resembling the strings of a harp. The foot is large, and there is no operculum. These shells are elegantly marked, and much prized for their beauty. Nine species are known, all of them tropical, and living in deep water, on soft, sandy or muddy bottoms.

HARPER, Ida Husted, American journalist and author: b. near Brookville, Ind. She attended the University of Indiana for two years; also Leland Stanford University two years; entered journalism when about 18, conducted a woman's department in the Terre Haute *Saturday Evening Mail* and in the *Firemen's Magazine*, and was a contributor to many papers, including the Cleveland *Leader*, San Francisco *Chronicle*, and Washington *Post*. She was managing editor of the Terre Haute *Daily News*, for a year, has written for the McClure syndicate, *Harper's Bazar*, and was for five years on the editorial staff of the New York *Sun*. She was a member of the International Congress of Women in London in 1899, and was appointed chairman of the international press committee for a five years' term. She prepared the Indiana State monograph for the World's Fair at Chicago under the title 'Organized Work of Indiana Women,' and has written 'Life and Work of Susan B. Anthony' (1898) and 'History of Woman Suffrage to the Close of the Nineteenth Century' (1901).

HARPER, Robert Francis, American Assyriologist: b. New Concord, Ohio, 1864; d. 1914. He received his education at the University of Chicago, and took his doctor's degree at Leipzig in 1886. He then instructed at Yale (1886–88, and 1889–91), after which he became associate professor of Semitic languages and literatures at the University of Chicago, succeeding to a full professorship in 1900. Dr. Harper made several trips to Assyria and Babylonia for the University of Pennsylvania (1888–89); for the British Museum (1891–92); and from 1903–06 to Babylonia, as director of an expedition. From 1908–09, he succeeded to the directorship of the American School for Oriental Study and Research in Palestine. He was appointed curator of the Haskell Oriental Museum (1900), and editor of the *American Journal of Semitic Languages* (1907). He was likewise associate editor of the *Biblical World*, and of the *American Journal of Theology*. His publications include ‘Assyrian and Babylonian Letters Belonging to the Kouyunjik Collections of the British Museum’ (1892–1913); ‘Babylonian and Assyrian Literature’ (1901); ‘The Code of Hammurabi’ (1904).

HARPER, Robert Goodloe, American lawyer and statesman: b. near Fredericksburg, Va., 1765; d. Baltimore, Md., 15 Jan. 1825. In his 15th year young Harper joined a troop of horse, and under General Greene served during the latter part of the Southern Revolutionary campaign. He was graduated from Princeton College in 1785, while there acting for a time as tutor to lower classes. Sailing from Philadelphia for Charleston, with the intention of studying law, he arrived at his destination nearly penniless, but was assisted by the father of a former pupil, who obtained a position for him in a lawyer's office. In one year he was qualified to practise, and soon established a reputation, and became well known by a series of newspaper articles on the proposed change in the State constitution of South Carolina. He was soon after elected to the State legislature, and in 1794 to the National Congress. In this position he showed marked ability, supported the administrations of Washington and John Adams, and was regarded as one of the leaders of the Federal party. On the election of Thomas Jefferson as President in 1801 he retired from Congress, and resumed the practice of his profession in Baltimore. At the Maryland bar he attained great eminence, at the period too of its highest renown. He was associated with Joseph Hopkinson as counsel for Judge Chase of the United States Supreme Court, when under impeachment. In 1815 he was elected United States senator from Maryland.

HARPER, William Rainey, American college president and Hebrew scholar: b. New Concord, Ohio, 26 July 1856; d. Chicago, Ill., 10 Jan. 1906. He was graduated at Muskingum College in 1870; was professor of Hebrew at the Baptist Union Theological Seminary, Chicago, in 1879–86; and of Semitic languages in the graduate faculty of Yale. From 1889 he was also professor of biblical literature. He was principal of the Chautauqua College of Liberal Arts in 1885–91, and in 1891 was appointed director of the Chautauqua system. In 1891 he was chosen first president of the new University of Chicago, where he was also head of the department of Semitic languages and literature. He was a founder and editor of *Hebracia* and the *Hebrew Student;* was an editor of three of the publications of the University of Chicago — the *Biblical World*, the *American Journal of Theology*, and the *American Journal of Semitic Languages and Literature*. His administration was noted for its rapid development of the facilities of the university. Among his works are ‘Elements of Hebrew’ (2d ed., 1890); ‘Hebrew Method and Manual’ (1885), and ‘Elements of Hebrew Syntax’ (1888), ‘The Trend in Higher Education’ (1905); ‘The Priestly Element in the Old Testament’ (1905).

HARPER, William Saint John, American artist: b. Rhinebeck, N. Y., 8 Sept. 1851; d. 4 Nov. 1910. He studied painting at the National Academy of Design, New York, and afterward became pupil of Munkacsy and Bonnat at Paris. He did much successful work both as a painter and book illustrator.

HARPER'S FERRY, W. Va., is situated in Jefferson County, 55 miles northwest of Washington, at the eastern extremity of West Virginia, on the Baltimore and Ohio Railroad. It is at the confluence of the Potomac and Shenandoah rivers, where the former breaks through the Blue Ridge, presenting one of the most picturesque scenes in America. Attracted by its fine waterpower, Washington, in 1796, chose it as a site for a United States arsenal and armory, and up to 1860 $1,800,000 had been expended for land and improvements. Here 10,000 muskets were made annually, and over 75,000 small arms were usually in store. It is the seat of Storer College and of a normal school for colored pupils. A severe flood of the Shenandoah in October 1878 created serious damage to the village of Harper's Ferry. Pop. 766.

Harper's Ferry got its name because Robert Harper settled there about 1747, and established a ferry across the Potomac. The place came into great prominence in 1859 through the acts of John Brown (q.v.), and was the scene of noteworthy military events during the Civil War. When Virginia seceded, Harper's Ferry was held by Lieut. Roger Jones, with 45 men. On the night of 18 April 1861 a large body of Virginia militia, hastily assembled from the surrounding country, appeared before the place. Jones set fire to the arsenal, destroyed as much public property as possible and retreated across the Potomac to Hagerstown, Md., and thence to Carlisle, Pa, The Virginia militia occupied the place, and troops were hastened to it from other States of the Confederacy. The Confederate government attached much importance to the place as a strategical point, but it was abandoned by Gen. J. E. Johnston, 15 June 1861, when he heard that General Patterson, marching from Chambersburg, Pa., was threatening to cross the Potomac at Williamsport. The place was then occupied by the National forces. When General Lee invaded Maryland early in September 1862, Harper's Ferry was held by Col. Dixon S. Miles with a large garrison, and there were strong outposts at Winchester and Martinsburg. Lee supposed that his presence at Frederick, Md., would cause the evacuation of Harper's Ferry and its outposts, and thus open his communications by way of Shenandoah Valley, but, as it was still held by the National forces it became a necessity to dislodge them. On the morning of 10 September he set three columns in motion from Frederick to surround the place and capture its entire garrison. General Jackson, with 14 brigades, marched rapidly over the South Mountain, crossed the Potomac at Williamsport on the 11th, drove the garrison from Martinsburg into Harper's Ferry, and appeared before Bolivar Heights on the 13th, thus investing the place from the west. General McLaws, with 10 brigades, marched through Brownsville Gap, and, after a severe engagement with Col. Thomas H. Ford on the 12th and 13th, drove him from Maryland Heights and into Harper's Ferry. General Walker, with his division, crossed the Potomac at Point of Rocks, 12 miles below Harper's Ferry, and on the 13th seized Loudoun Heights beyond the Shenandoah. Miles was now completely surrounded, the Confederates occupying high ground, commanding his position. Artillery fire was opened from all these points on the 14th, and late in the afternoon Jackson moved upon Bolivar Heights, drove in Miles' skirmish lines and gained an advantageous position on the left of the Union line. During the night 1,500 Union cavalry crossed from Harper's Ferry to the Maryland side and escaped. During the same night Jackson crossed 10 guns to the right bank of the Shenandoah and established them on a plateau at the foot of Loudoun Heights, enfilading Miles' entire position on Bolivar Heights. Early on the 15th the Confederate guns on Maryland Heights, Loudoun Heights and in front of Bolivar Heights opened fire, which was responded to for more than an hour, but the direct and plunging flank-fire from the Confederate batteries partially silenced the Union guns and created some disorder in the Union ranks. Jackson had advanced his lines to within 150 yards of the Union works on Bolivar Heights, and was about to assault, when Miles ordered a white flag displayed on his works and directed Gen. Julius White to arrange terms of capitulation, soon after which Miles was mortally wounded by a shell from a battery that had not seen the white flag. The Union loss during the siege was 44 killed and 173 wounded, and the number of prisoners surrendered and paroled 12,520. The Confederates captured 70 guns, 13,000 small arms, 200 wagons and a large amount of quartermaster and commissary stores. The Confederate loss was 41 killed and 247 wounded, the greater part of whom were lost in the engagement on Maryland Heights. The Confederates abandoned Harper's Ferry on the 20th, and it was again occupied by the Union forces on the 22d. Consult ‹Official Records› (Vol. II and XIX); Allan, ‹Army of Northern Virginia in 1862›; the Century Company's ‹Battles and Leaders of the Civil War› (Vols. I and II).

E. A. Carman.

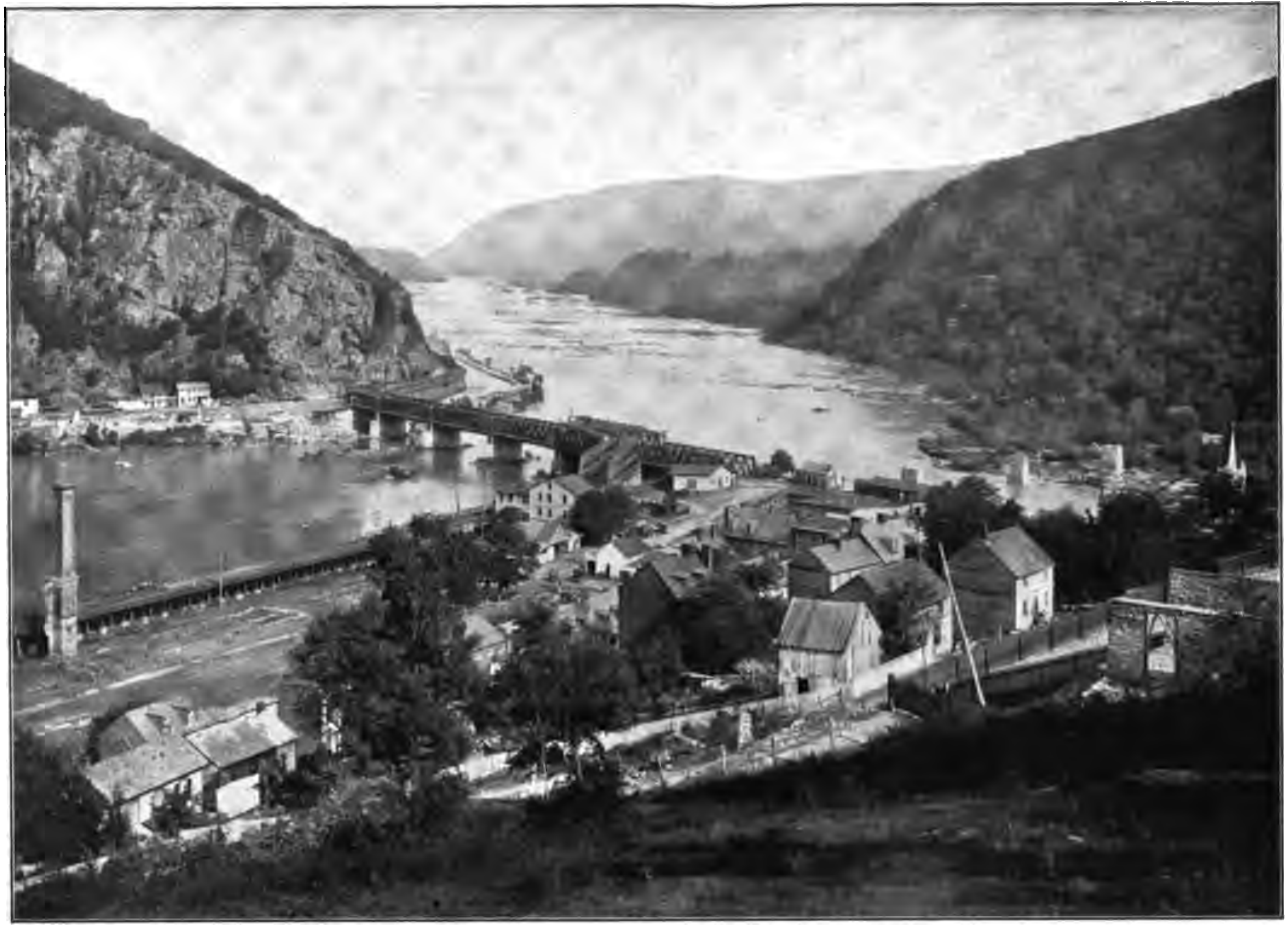
HARPIES (Greek, *Harpuiai*, swift robbers), the goddesses of storms. Their ages, appearance, names and number are so variously given by the poets that it is difficult to say anything definite concerning them. In the Homeric poems they are represented as personified stormwinds. The later poets and artists vied with each other in depicting them under the most hideous forms. One has given them the head of a fowl, with wings and a body covered with feathers, human arms with claws, a white breast and human legs which terminate in the feet of a fowl. Others have given them the face of a young woman with the ears of a bear. See Furies.

HARPIGNIES, Henri Joseph, ŏṅ-rē̤ zhō-zĕ̤f är-pēn-yē̤, French landscapist: b. Valenciennes, 28 July 1819; d. Saint Prive, 28 Aug. 1916. He studied at Paris with Achard, first exhibited at the Salon of 1853, and in 1861 attracted attention by his ‹Edge of a Wood beside the Allier.› His landscapes, done with equal success in oils or water-colors, evince a skilfulness of drawing and a coloristic truthfulness marred only occasionally by a harshness in matters of technique. His works include ‹View of Capri,› ‹Le Saut du Loup,› ‹Banks of the Rhone› (Metropolitan Museum, N. Y.); ‹Garden of the Villa Medici,› ‹Le Pont Neuf,› and ‹The Hour of the Wild Goose.›

HARPSICHORD, a stringed instrument formerly in use, in appearance and construction similar to a grand pianoforte. In the front the keys were disposed, the long ones being the naturals, and the short ones the sharps and flats. This instrument, called by the Italians *clavicembalo*, by the French *clavecin*, was an improvement upon the clavichord, which was borrowed from the harp. Both are now superseded by the pianoforte. Consult Galpin's ‹Old English Instruments› (1911). See Pianoforte.

HARPSWELL, Me., a township including the post village of Harpswell Centre, and comprising a peninsula and some islands in Casco Bay, 14 miles east of Portland. It has agricultural interests and grist-mills, but is chiefly noted as a summer resort. Pop. 1,650.

HARPUR, Robert, American educator: b. Ballybay, County Monaghan, Ireland, 25 Jan. 1733; d. Harpursville, N. Y., 1825. His mother's father fought in the battle of the Boyne and left Scotland to enjoy religious freedom. His father was a man of means and intelligence and a rigid Presbyterian. The son graduated at Glasgow University and, finding his faculty for public address unequal to the demands of preaching, turned to the work of teaching in the grammar school of Newry. He shortly set out for America and arrived at New York 1 Sept. 1761. Within a few days he engaged himself to teach mathematics and physics in the recently chartered King's (later Columbia) College, and after a time also became librarian. Remembering his oppressed neighbors at home, he undertook to secure land grants for them and by his assistance one entire parish, with their pastor, Dr. Thomas Clark, immigrated and founded the town of Salem, N. Y. In the Revolution Professor Harpur cast in his lot with the patriots, becoming a deputy to the 3d and 4th Provincial Congresses and a member of the new State assembly from 1777 to 1784, and also acting as a commissioner for detecting and defeating conspiracies for Dutchess County. He served likewise as deputy secretary of state under the first two incumbents of the office, John Morin Scott and his son, Lewis Allaire Scott, and later, covering the years 1778–95; and in the capacity of secretary to the State Land Board was probably sponsor for the military townships of central New York, whose classical names have ever since been the subject of criticism and wonder.



VIEW OF HARPERS FERRY, VA.

Poughkeepsie now became his residence until the close of the war, when he returned with the State government to New York city. On the creation of the Board of Regents to control State educational interests, Professor Harpur was made a member and served as its first secretary. In 1795, at the age of 62, he resigned his public posts and, turning from the habits and associations of a lifetime, took up the career of a pioneer in the wilderness of Broome County, where he had acquired a tract of 15,360 acres in what is now Colesville township. Here for 30 years he encouraged settlement by his generosity and won a wide repute for his counsel and philanthropy.

HARRADEN, Beatrice, English novelist: b. Hampstead, London, 24 Jan. 1864. Her first novel, ‘Ships that Pass in the Night’ (1893), was instantly successful. It has been followed by ‘In Varying Moods’ (1894); ‘Hilda Strafford’ (1897); ‘The Fowler’ (1899); ‘Katharine Frensham’ (1903); ‘The Scholar's Daughter’ (1906); ‘Interplay’ (1908); ‘Out of the Wreck I Rise’ (1912).

HARRIMAN, Edward Henry, financier and railroad director: b. Hempstead, L. I., 25 Feb. 1848; d. 9 Sept. 1909. He was the son of the Rev. Orlando Harriman, rector of Saint George's Episcopal Church, Hempstead, and was educated at Trinity School, New York City. He commenced commercial life at the age of 14 as a broker's clerk in New York, and at 22 became a member of the New York Stock Exchange. He founded the banking and brokerage firm of Harriman and Company in 1872 and prospered in speculation. Associated with Mr. Stuyvesant Fish he became interested in American railways and in 1883 began a succession of operations connected with the Illinois Central Railroad, the Union Pacific, the Central and Southern Pacific railways and the Oregon Railroad and Navigation Company which gave him control of the traffic from Chicago to the Pacific Coast. He received a severe check from James J. Hill in 1901 when he sought to gain control of the Northern Pacific, and also from Thomas F. Ryan when he attempted to dominate the Equitable Life Assurance Society, of which he was a trustee; part of its funds had been used in the fight with James J. Hill and one of the most serious financial crises in the history of Wall Street ensued.

An investigation of the Harriman lines in 1906 by the Interstate Commerce Commission, however, revealed Harriman as the ruler of the American railroad world; this was accentuated in 1907 when he forced his former associate, Stuyvesant Fish, out of the presidential chair of the Illinois Central. Keen and unscrupulous, his methods all bent on success were savagely criticized, but resulted in better public railway service. A comparatively sudden failure in health led to his death. To his wife he bequeathed the whole of his enormous fortune valued at from $200,000,000 to $600,000,000.

HARRIMAN, Tenn., city in Roane County, on the Emory River, the Southern, the Tennessee Central and the Queen and Chattanooga railroads, about 78 miles northeast of Chattanooga, and 37 miles west of Knoxville. It was founded in 1890 and received its city charter in 1891. The charter was revised in 1899. It is situated in an agricultural region which contains rich deposits of coal and of iron ore, and some timber land. Its chief manufactures are foundry and machine shop products, leather, farm implements, iron, flour, lumber, cotton goods and furniture. It is the seat of an industrial school for colored children and of the American University, established in 1893. Its trade in agricultural and mining products and in its own manufactured articles is rapidly increasing. The waterworks and electric-light plant are owned and operated by the city. Pop. 3,061.

HARRIMAN ALASKA EXPEDITION, an American scientific and artistic expedition which visited the southern coast of Alaska during the summer of 1899. The party was organized by Edward H. Harriman, and consisted of the members of his own family, a few friends and 50 men eminent for scientific and literary attainments, who made good use of their opportunities in investigating the geography, geology, glacial phenomena and fauna and flora of the region visited.

The results were over 300 species and subspecies of animals and plants, records of observations of 22 «living» glaciers, those which discharge icebergs directly into the sea, and of 100 «dead» glaciers, those whose fronts do not reach the sea. A new chart was made of the part of the coast explored. (See HARRIMAN FIORD). Some of the new animal species found are two of foxes, five species and sub-species of shrews, five of hares, one crab, a shrimp and 25 sea-worms. One of the sea-worms is about six feet long and of a deep vermilion color; another about the same size is blood-red with a white head. In no other part of the world have been found sea-worms of such varied and striking forms and colors. Among the plants found were a large number of new species and sub-species. Each department of science was represented by one or more experts who made critical observations and accurate reports. Consult ‘Reports of the Harriman Alaska Expedition’; ‘The World's Work’ (1900); ‘Discoveries in our Arctic Region.’

HARRIMAN FIORD, on the southern coast of Alaska, at about lat. 61° N. and long. 145° W., is an arm of Prince William Sound, 15 miles in length. This fiord was discovered by the Harriman Alaska Expedition (q.v.), in 1899. It is full of glaciers of every description, waterfalls and forests.

HARRINGTON, Mark Walrod, American astronomer: b. in Sycamore, Ill., 18 Aug. 1848. He was educated at the University of Michigan and later in Leipzig, and in 1870–71 assisted in the United States Coast and Geodetic Survey of Alaska. He was professor of astronomy and director of the observatory at the University of Michigan, 1879–91. In 1884 he established the *American Meteorological Journal* and was its managing editor until 1892. In 1891 he became chief of the Weather Bureau at Washington, D. C., which post he held till 1895, and was president of the Washington State University 1895–97. He is the author of ‘About the Weather’ (1899).

HARRIOT, Thomas, English mathematician: b. Oxford, 1560; d. London, 2 July 1621.

He entered Saint Mary's Hall, Oxford, and was graduated in 1580. In 1585 he was sent by Sir Walter Raleigh as surveyor on the Grenville expedition to Virginia, and on his return he published an account of Virginia, later printed in Hakluyt's 'Voyages.' He gained the favor of the Earl of Northumberland, who gave him an annual pension, and thereafter devoted himself entirely to mathematical and scientific research. His chief work, 'Artis Analyticæ Praxis ad Equationes Algebraicas Resolvendas,' published in 1631, embodied the most important results of his mathematical work. He practically gave to algebra its modern form, improving the notation, being the first to equate all the terms of an equation to zero, and announcing the principle that every equation has as many roots as its dimension. He also did important work in astronomy. Consult the biography by Stevens (1909); and the 'Harriot Papers,' edited by Rigaud (1831). See ALGEBRA, HISTORY OF THE ELEMENTS OF.

HARRIS, Amanda Bartlett, American writer: b. Warner, N. H., 15 Aug. 1824. She is a popular writer for young people and has published 'How We Went Bird-Nesting' (1880); 'Wild Flowers, and Where They Grow' (1882); 'Door-Yard Folks, and a Winter Garden' (1883); 'Pleasant Authors for Young Folks' (1884); 'Old School Days' (1886); 'American Authors for Young Folks' (1887); 'The Luck of Edenhall' (1888), etc.

HARRIS, Frederic Robert, American engineer and naval officer: b. New York, 10 April 1875. In 1896 he was graduated at the Stevens Institute of Technology, Hoboken, N. J., served as engineer for various companies interested in water-front improvements on the Atlantic Coast from 1896 to 1903, when he entered the naval service as member of the Naval Corps of Civil Engineers. He was made lieutenant in 1907 and lieutenant-commander in 1913. He served as principal assistant on construction at the new navy yard and dry-dock at Charleston, S. C.; was in charge of construction of the naval station at Guantanamo, Cuba, in 1906–07, assistant to the chief of the Bureau of Yards and Docks, Washington, 1907–09, and head of the department of public works at the Brooklyn navy yard in 1909–15, when he entered on similar duties at the Philadelphia yard. In 1917 he was raised to the rank of rear-admiral.

HARRIS, George, American college president: b. East Machias, Me., 1844. He was graduated at Amherst 1866; and at Andover Theological Seminary 1869. After taking several pastoral charges he became professor of Christian theology at Andover 1883, from which position he passed in 1899 to the presidency of Amherst. He resigned this position in 1911. He was one of the editors of the *Andover Review,* 1884–93. Among his works are 'Moral Evolution' (1896); 'Inequality and Progress' (1897); 'A Century's Change in Religion' (1914).

HARRIS, Joel Chandler, American journalist and author: b. Eatonton, Ga., 8 Dec. 1848; d. Atlanta, Ga., 3 July 1908. He began his career as a printer's apprentice on the Forsyth (Ga.) *Countryman* and was on the staff of the Savannah *Daily News,* 1871–76. He was connected with the Atlanta *Constitution* for 25 years. The series of "Uncle Remus" sketches and songs which gave him an international reputation were first printed in the *Constitution.* His published books include 'The Folk-Lore of the Old Plantation' (1880); 'Nights With Uncle Remus' (1883); 'Mingo and Other Sketches' (1883); 'Daddy Jake, the Runaway' (1889); 'Free Joe and Other Stories' (1887); 'Balaam and His Master' (1890); 'Mr. Rabbit at Home' (1895); 'The Story of Aaron' (1896); 'Stories of Georgia History' (1897); 'Sister Jane,' a novel (1897); 'Minervy Ann' (1899); 'On the Wing of Occasion' (1900); 'The Making of a Statesman'; 'A Little Union Scout'; 'Told by Uncle Remus' (1905); 'Uncle Remus and Br'er Rabbit' 1907, etc. He created a literature from his observation of the plantation negro and his stories, which is a distinct addition to folklore, and a valuable side light on the character of the old-time Southern negroes, and country life in Georgia. Consult Harris, Julia Collier, 'Life and Letters of Joel Chandler Harris' (New York 1918).

HARRIS, Merriam Colbert, American Methodist missionary bishop of Japan and Korea: b. Beallsville, Ohio, 9 July 1846. Veteran of the Civil War, in the 12th Ohio Cavalry. Missionary of the Methodist Episcopal Church in Japan, 1872–86, and superintendent of the Japanese Mission in San Francisco, in Hawaii and the Pacific Coast 1886–94; bishop of Japan and Korea 1904–15. His incessant philanthropic labors have been recognized by the emperor of Japan, who awarded a decoration of the Sacred Treasure, 3d class. Author of 'One Hundred Years of Missions,' 'Christianity in Japan' and 'Japanese Proverbs.' His wife, FLORA LYDIA BEST (d. September 1909), besides writing on Japanese themes, translated the 10th century classic, 'Tosa Niki' ('Diary or Log of Journey from Tosa to Kyoto' (1891).

HARRIS, Miriam Coles, American novelist: b. Dosoris, L. I., 7 July 1834. She was married to Sidney S. Harris in 1864 and has since lived in New York. She wrote 'Rutledge' (1860); 'The Sutherlands' (1862), both widely read, and among later and almost equally popular works of hers are 'A Perfect Adonis' (1875); 'Missy' (1880); and 'An Utter Failure' (1891); 'The Tents of Wickedness' (1907).

HARRIS, Samuel, American theologian: b. East Machias, Me., 14 June 1814; d. Litchfield, Conn., 25 June 1899. He was graduated from Bowdoin College and from Andover Theological Seminary. He was a teacher for a time and held Congregationalist pastorates in Conway, Mass., 1841–51. In 1855 he was appointed professor of systematic theology in Bangor Seminary; was president of Bowdoin 1867–71; and then became professor of systematic theology in the Yale Divinity School. His writings include 'Zaccheus or the Scriptural Plan of Benevolence'; 'Kingdom of Christ on Earth' (1874); 'Philosophical Basis of Theism' (1883); 'Self-Revelation of God' (1887); 'God, Creator and Lord of All' (1897).

HARRIS, Thaddeus William, American entomologist: b. Dorchester, Mass., 12 Nov. 1795; d. Cambridge, Mass., 16 Jan. 1856. He was graduated at Harvard College in 1815, studied medicine and practised his profession in Milton, Mass., until appointed librarian of Harvard in 1831. This position he occupied until his death. Early in life he exhibited a fondness for natural history, and though plodding alone, attained to a scientific eminence which secured for him the fellowship of all the principal learned societies of America, and of many abroad. For several years he gave instruction in botany and general natural history in the college, and originated the Harvard Natural History Society for the students. He was chiefly distinguished, however, as an entomologist, and has been surpassed as such by no one in the United States. He was one of the founders of the Massachusetts Horticultural Society. In 1837 he was appointed one of the commissioners for a zoological and botanical survey of Massachusetts, the result of which was his 'Systematic Catalogue of the Insects of Massachusetts' (1832), in which 2,350 species are enumerated. He also published 'A Treatise on some of the Insects of New England which are Injurious to Vegetation' (1842), a work of permanent value.

HARRIS, Thomas Lake, American socialistic and religious reformer: b. Fenny Stratford, England, 15 May 1823. He accompanied his father to the United States in childhood, was for a time a Universalist pastor, and founded an 'Independent Christian Society' in 1850; but became a lecturer upon spiritualism. He lectured abroad in 1858, and on his return to the United States organized the society of the "Brotherhood of the New Life." This was established at Wassaic, Dutchess County, N. Y., 1861–67, but removed to Brockton, Chautauqua County, N. Y., in the last-named year. Its nature was co-operative rather than communistic, and farming and industrial occupations were engaged in by his followers, numbering at one time about 2,000 in the United States and Great Britain, among them Lady Oliphant and her son, the well-known writer, Laurence Oliphant (q.v.). Harris removed to California in 1887, and retired to private life in 1895, residing in New York city. He published many works in prose and poetry, among which are 'Wisdom of Angels' (1856); 'Arcana of Christianity' (1857); 'Modern Spiritualism' (1860); 'God's Breath in Man' (1891). Consult Allen, 'T. L. Harris, The Seer' (1897).

HARRIS, Townsend, American merchant and diplomatist, of Welsh descent and of Revolutionary stock, the youngest of five children: b. Sandy Hill, N. Y., 4 Oct. 1804; d. New York city, 25 Feb. 1878. He received his education at the village school and academy. From 1817 to 1848 he was in business in New York city, continuing his self-culture by continuous and critical reading of the best literature, learning also the French, Spanish and Italian languages; was member of the board of education and in 1846–47 its president. He was the practical founder of the New York Free Academy, now the College of the City of New York, and in many ways was a typically useful citizen. He never married. In 1848 he went to California and during the following six years made trading voyages to China and the Dutch and English Indies, becoming thoroughly acquainted with the manifold Oriental varieties of human nature. He acted for a time as American vice-consul at Ningpo. He was appointed consul-general to Japan and on the United States steamship *San Jacinto* arrived at Shimoda, his future dwelling place (and now noted for its stone quarries), where the flag of the United States was hoisted 4 Sept. 1856. From the first Mr. Harris spoke the truth as against the constant deceit and prevarication of the corrupt officials of the Yedo Shogunate, demanding the courtesies due to an accredited envoy of a civilized power and refusing to deliver the President's letter to any one but the Shogun in Yedo and to him personally. Unbacked by a single ship or man, and with his secretary only, after prolonged negotiations lasting 18 months, he made a triumphal progress to Yedo, and standing erect received personal audience of the Shogun in the palace. Then began four months' instruction of these political hermits in the methods of modern international law and procedure. He concluded the treaty and received the promise of signature by the Premier, without regard to anything happening in China. Nevertheless the arrival of Commodore Tatnall with two American men-of-war, bringing news of the humiliation of the Chinese emperor and court, undoubtedly had its influence on the Japanese. Mr. Harris urged the importance of having the treaty signed without a moment's delay, and the Premier Ii dispatched commissioners to affix their signatures, and soon after an embassy to the United States, for which reason, chiefly, Ii was assassinated in Yedo, 23 March 1860. The Harris treaty secured the right of trade, residence and of missionary operations and teachings. He was buried in Greenwood Cemetery, Brooklyn, N. Y. One of the important buildings of the College of the City of New York, the "Townsend Harris Hall," is named after him. In Japan, the name of no foreigner is more highly honored. In 1918, the cornerstone of a monument in his honor was laid at Kanagawa. Mr. Harris has always been very highly thought of by the Japanese, and is still the subject of much praise and appreciative writings by Japanese authors. His journals with comment and biography were published in 1896.

William Elliot Griffis,
Author of 'Townsend Harris, First American Envoy in Japan.'

HARRIS, William Torrey, American educator and metaphysician: b. North Killingly, Conn., 10 Sept. 1835; d. Providence, R. I., 5 Nov. 1909. He studied at Yale in the class of 1858, and after teaching in the Saint Louis public schools, 1857–67, was superintendent of the schools of that city 1867–80. While in Saint Louis he founded in 1867 the *Journal of Speculative Philosophy.* He removed to Concord, Mass., in 1880 and aided in founding the Concord School of Philosophy at which he lectured on metaphysical themes. From 1889 to 1906 he was United States Commissioner of Education. He has edited Appleton's School Reader and Appleton's Educational Series and is the author of 'Hegel's Logic: a Critical Exposition' (1890); 'The Spiritual Sense of Dante's Divina Commedia' (1891); 'Introduction to the Study of Philosophy'; 'Psychologic Foundations of Education.'

HARRISBURG, Pa., city of the third class, capital of the State and county-seat of Dauphin County, on the Susquehanna River and the Northern Central, Pennsylvania, Cumberland Valley and Philadelphia and Reading railroads; situated 106 miles northwest of Philadelphia, has been for many years an important railroad, agricultural, industrial and commercial centre. During the decade from 1902 to 1912 its citizens took up in earnest the matters of municipal improvement. The city's rapid strides along every line of activity in this matter were phenomenal and its growth into a model city was so extensive and successful as to attract general attention throughout the country.

History.— The site selected for his future city by the founder, John Harris, was on the Susquehanna River at a point where the river is nearly a mile in width and where the two great trails, the southern and western, intersected each other as they trended from the north and east. The county of which Harrisburg afterward became the county-seat, Dauphin, adopted its name from the title of the eldest son of the King of France (for the time being Louis XVI) and the name of the city in some of its earliest records being called Louisburg; France at that time being uppermost in the affections of the people in consequence of its friendliness and efficient aid rendered to the colonies in the days of their extremity. The original town was laid out in 1785 and was incorporated into a borough in 1791. John Harris, the elder, was an adventurous English trader who built the first house here in 1726 and secured a grant of 800 acres of land. His son John, the founder of the town, established a ferry here in 1753 and the place was known for many years as Harris' Ferry. The town of Harrisburg became the capital of the State in 1812 and was chartered as a city in 1861. The Harrisburg Conference, famous in American political history, was held here in 1788 and Harrison and Tyler were nominated here in 1839.

Topography.— High hills and higher mountain ranges surround the city and the intervening valleys are made up of rich rolling farm lands intersected by many streams of varying width. The Susquehanna river-front is spanned by four attractive bridges, two for railroads and two for vehicles and pedestrians. From various elevated points in the city glimpses can be had of the magnificent stone arch bridge of the Pennsylvania Railroad at Rockville, said to be the longest four-track stone bridge in the world.

Commerce and Industry.— Harrisburg is a city of first importance in its iron, steel, lumber and railroad interests, the roundhouses and repair shops of the Pennsylvania Railroad are located here and give employment to thousands of workmen. There are extensive manufactories of machinery, malt liquors, boilers, castings, brooms, cars, coaches, tanned leather, lumber, cotton goods, beds, mattresses, coffins, silk goods and a number of rolling-mills, tin mills, blast furnaces, nail-works, typewriter works and boot and shoe factories. The city has one morning and two evening daily newspapers and many weekly and monthly publications.

Public Buildings and Activities.— The State capitol building, erected a few years ago at a cost exceeding $13,000,000, is the chief attraction among the public buildings. The main capitol building is constructed of steel and brick with facings of marble and granite. The style of architecture is composite. It stands upon an elevation and from whichever direction approached presents an imposing appearance. The main entrance to the grounds is from State street, facing due west, and is by way of a wide stone stairway broadening at the top into an esplanade with fountains at either side. In the centre, overlooking the entrance, stands the equestrian statue, in bronze, of Gen. John F. Hartranft, facing the Dauphin County soldiers' monument to the memory of those who fell in the Civil War. On either side of the main entrance to the building, the Barnard groups of statuary complete and harmonize a strong ensemble. The interior of the building is well worth a visit. The decorations are the production of the highest art and are symbolical of the growth of civilization in America and the history of Pennsylvania. The State Library at the capitol, founded in 1790, contains over 100,000 volumes. The park which surrounds the capitol buildings is being enlarged and systematic steps are being taken for its future improvement. Among other places of interest in the city are the State arsenal, the courthouse, the Pennsylvania State lunatic hospital, the executive mansion and the post office. The Penn-Harris Hotel, the new hotel erected by the citizens under the auspices of the Chamber of Commerce, was formally opened 1 Jan. 1919. The educational institutions include the central high school, the technical high school, the Harrisburg Academy, Saint Genevieve's Academy and a young ladies' seminary. There are many charitable institutions, among the oldest of which are the Home for the Friendless and the Children's Industrial Home, the Harrisburg and other hospitals. The Chamber of Commerce and Civic Club are virile bodies and in active service.

Transportation.— Harrisburg has long been the centre of the Pennsylvania, Philadelphia and Reading, Cumberland Valley and Northern Central railroads. It also has in operation one of the most extensive electric street railway systems in the United States. The suburban railway service, both trolley and steam, is excellent, and has greatly aided in building up this outlying residential section of the city.

Churches.— Harrisburg has had for years the reputation of being "a Church-going Community." There are within the limits of the city 83 churches and permanent church organizations. These are divided among 14 regular sectarian organizations as follows: Presbyterian 11; Methodist Episcopal 11; Lutheran 12; Baptist 8; Roman Catholic 6; Church of God 5; United Brethren in Christ 5; Protestant Episcopal 4; Reformed 4; Jewish 3; Zion Baptist 3; African Methodist Episcopal 3; United Evangelical 2; Brethren in Christ, Christian and Missionary Alliance, Christian Science, Disciples of Christ, Seventh Day Adventists and Salvation Army, each 1. Harrisburg is the seat of a Roman Catholic bishop.

Municipal Administration.— Under the act of assembly, approved 27 June 1913, in governing cities of the third class in Pennsylvania, the form of the government was changed to the commission form. The legislative, executive and administrative powers are vested in the city council, composed of the mayor and four councilmen, elected at large on a non-partisan ticket, the mayor for four years and the councilmen for two years, with no restriction as to re-election. All legislative powers are exercised by the city council, the mayor, by virtue of his office, being president. The executive and administrative powers and authority are distributed into and among the following five departments: Department of public affairs, department of accounts and finance, department of public safety, department of streets and public improvements, department of parks and public property.

The city council determines the powers and duties to be performed and assigns them to the appropriate department. The mayor is designated as the superintendent of the department of public affairs, and the council at its first regular meeting after its election designates by majority vote one councilman to be superintendent of each of the remaining departments and has the power to change such designation whenever it appears that the public service would be benefited thereby. The councilman chosen as the superintendent of the department of accounts and finance becomes the vice-president of the city council and acting mayor during the absence or inability of the mayor to act, exercising all the rights and powers of the mayor. The council has the power of appointment and dismissal of all the employees and subordinate officers of the city, as well as the fixing of salaries and terms, except those fixed by the act of assembly and those appointments regulated by civil service. The following officers whose terms are fixed by law are elected by a majority vote of the council: City solicitor, city engineer, city treasurer, city clerk and city assessor. In addition to the above officers, the council has the power to create any office, public board or department which they may deem necessary for the good government and interests of the city. The schools are governed by a board of control or directors who are elected by a vote of the citizens.

Banks and Finance.— Harrisburg has four national banks and a dozen other banking institutions, trust companies and building and loan associations. The assessed real estate (1918) is $62,000,000; the tax rate is constantly changing; the municipal income amounts to $875,000. The principal items of expense are: Fire department, $48,500; water department, $108,500; street lighting, $68,800; police department, $105,700; highway department, $172,200.

Municipal Improvements.—As before stated, Harrisburg, through the progressiveness and enterprise of her citizens in the decade from 1902 to 1912, brought about results which won for her the sobriquet of «Model City.» These results are best shown by the following brief survey of the principal of her improvements as they stand at present, and the most particularly striking of these are her parks, briefly described as follows: Total acreage of parks, about 1,000. Paxtang park, 18 acres, an amusement park; Reservoir park, 88 acres, contains the city reservoir, which gives a lake setting to the park. The scenic view from the elevations in this park is the best that can be had from any point; Capitol park, 16 acres, contains the State capitol buildings, the equestrian statue of General and Governor John Frederick Hartranft, and the Mexican monument mentioned elsewhere; Harris park, 4 acres; river front from Paxton street to Mulberry street; Lincoln park, 2¼ acres, river front from Mulberry to Market streets; Promenade park, 3½ acres, river front from Market to State streets; D. W. Gross park, 2 acres, river front from water house to Herr street. These four parks extend along the banks of the Susquehanna River for over a mile and are being further extended at each end. Island park, 18 acres, site of filter plant, and public playground and athletic grounds; 12th street playgrounds, 8 acres, devoted to the use of children; Wildwood park, 666 acres, with large lake, boating in summer and skating in winter; boulevard or parkway, 146 acres, along streams and through beautiful ravines and meadows.

Paved Streets.— Total amount of paving, 1 Jan. 1918, 76.93 miles; total length of macadamized highways, 1 Jan. 1918, 9.06 miles; total length of earth and gravel highways, 1 Jan. 1918, 43.70 miles. It will be understood that this satisfactory result in the matter of street paving received its impetus from the movement in 1902. The city has more than 90 miles of sewers.

Population.—The population of Harrisburg under the census of (1910) was 64,186. The present estimated population is 83,000.

Consult Morgan, ‹Annals of Harrisburg,› revised by F. M. Black (1906).

BENJAMIN M. NEAD,
President of the Historical Society of Dauphin County; and Member of the Harrisburg Chamber of Commerce.

HARRISBURG CONVENTION, a meeting called by the anti-Federalists of Pennsylvania to be held at Harrisburg, Pa., on 3 Sept. 1788 for the purpose of deliberating regarding the new Federal Constitution. Although the meeting was well attended and adopted resolutions carrying 12 amendments to the Federal Constitution, to be presented for action to the Pennsylvania legislature in form of a petition, it was abortive inasmuch as even this petition was never formally presented. Another meeting, known by the same name, was the assembly convened in 1828 at Harrisburg, Pa., by the protectionist faction of the New England and Middle States, consequent on the rejection of the high tariff «Woolen Bill» in the Senate, by the casting vote of the Vice-President. The forcible presentation of the cause of protection, and the demand of the convention for an increased duty on several manufactured articles, resulted in the passage of the high tariff bill of 1828. Consult Ford, P. L., ‹The Origin, Purpose and Result of the Harrisburg Convention of 1788› (Brooklyn 1890).

HARRISON, Benjamin, American statesman: b. Berkeley, Va., about 1740; d. April 1791. While a very young man he was elected to the house of burgesses of which he was twice speaker, and in 1773 was chosen a member of the committee which united the colonies against Great Britain. He was a member of the Continental Congress, 1774–77, being a member of many important committees, especially in connection with the conduct of the War of the Revolution, and on 4 July 1776, reported, as chairman of the committee of the whole House, the Declaration of Independence, of which he was one of the signers. He was opposed to the ratification of the Federal Constitution, but after its adoption supported the national government. Upon his return to Virginia he was immediately re-elected to the house of burgesses and served as its speaker until 1782. From 1872-85 he was governor of Virginia. His brother, Charles, was a noted general in the American army during the Revolution, his son, William Henry Harrison (q.v.), became ninth President of the United States, and his great-grandson and namesake, Benjamin Harrison (q.v.), 23d President of the United States. Consult Lossing, B. J., 'Biographical Sketches of the Signers of the Declaration of American Independence, etc.' (New York 1854); Sanderson, J., 'Biography of the Signers of the Declaration of Independence' (revised ed., Philadelphia 1865); Spark, J., ed., 'The Diplomatic Correspondence of the American Revolution, etc.' (12 vols., Boston 1829-30); United States Continental Congress, 'Journals of the Continental Congress, 1774-77' (W. C. Ford, ed., Vols. I-IX, Washington 1904-07).

HARRISON, Benjamin, 23d President of the United States: b. North Bend, Ohio, 20 Aug. 1833; d. Indianapolis, Ind., 13 March 1901. He was a great-grandson of Benjamin Harrison, signer of the Declaration of Independence (q.v.), and grandson of William Henry Harrison, ninth President (q.v.). He was graduated from Miami University (Oxford, Ohio) in 1852, studied law in Cincinnati, was admitted to the bar in 1853 and in 1854 began in Indianapolis the practise of his profession. In 1860 he was elected reporter of the Supreme Court of the State. At the time of his election to the Presidency (1888) he was one of the foremost leaders of the State bar. At the outbreak of the Civil War he assisted in recruiting the 70th regiment of Indiana Volunteers, of which he became colonel (August 1862). He was an exceedingly efficient commander. For some time he was detailed to guard railways in the West; and in the campaign from Chattanooga to Atlanta the regiment was in the 20th Army corps, the commander of which was Gen. Joseph Hooker. Harrison commanded a brigade at Peach Tree Creek, where he served with especial distinction, and also at Nashville. He was present at Johnston's surrender at Durham Station, N. C., in 1865, was brevetted brigadier-general for his services in command of the brigade, and in June of that year was mustered out. The Supreme Court of Indiana had declared that Harrison by his enlistment vacated his office of reporter, and a Democrat was elected by default to fill that office for the unexpired term. At the election of 1864 Harrison, while still in the field, was rechosen. In 1867 he refused a renomination, and recommenced his legal practice, in which he was largely retained in both the Federal and State courts. In 1876 he became, on the retirement of the original candidate, the Republican candidate for the governorship, and though he ran about 2,000 votes ahead of his ticket, he was defeated by a Democratic plurality of 3,000. He was appointed a member of the Mississippi River commission in 1879, and in 1880 was chairman of the Indiana delegation in the Republican National Convention. At that convention, where he cast nearly the entire vote of the State for Garfield, he was himself mentioned in connection with the Presidency. From 1881 to 1887 he was in the United States Senate, in which he took rank as a prominent debater. He opposed Cleveland's vetoes of the pension bills, urged increase in the navy and civil-service reform, and as chairman of the Committee on Territories demanded the admission as States of North and South Dakota, Montana, Washington and Idaho. In 1884 he was a delegate to the Republican National Convention. At the convention of 1888 (Chicago, Ill.) he was presented by the solid Indiana delegation as a candidate for the nomination to the Presidency; and on the eighth ballot he received the nomination by a vote of 544. The campaign was a vigorous one, and Harrison made many excellent speeches. He was elected, receiving in the electoral college 233 ballots to 168 for Grover Cleveland. His administration was broadly characterized by a firm defense of American interests in foreign affairs and a general promotion of industry and governmental effectiveness. During this time the 55th Congress passed the tariff act known as the McKinley Law; the reciprocity system was introduced; the new navy was extended; civil-service reform was promoted; and the Pan-American Congress with representatives from all Central and South American countries was held at Washington in the winter of 1889-90. The Bering Sea arbitration respecting the seal fisheries was also organized between Great Britain and the United States. The Samoan difficulties were adjusted; and the Chile affair, concerned with an attack on American sailors either connived at or permitted by Chilean authorities, was promptly and satisfactorily settled by enforced reparation on the part of Chile. At the Minneapolis convention of 1892 Harrison was renominated without serious opposition. He was a second time opposed by Cleveland, and his defeat by 276 electoral votes to 145 was an occasion for some surprise. Upon his retirement from office, he returned to the practice of law, and in 1893-94 delivered a course of lectures on constitutional law at Stanford University. In 1899 he appeared as counsel for Venezuela in the Anglo-Venezuelan Boundary Arbitration Commission. He was appointed a member for the United States of the Peace Conference held at The Hague in 1899, and became one of the International Board of Arbitration. He wrote 'This Country of Ours' (1897). A complete collection of his public addresses from 1888 to 1892 was edited by Hedges (1892). A posthumous collection of articles, 'Views of an Ex-President,' was published in 1901. Consult the campaign life by Lew Wallace (1888), and Wilson (editor), 'The Presidents of the United States' (1894).

GEORGE EDWIN RINES.

HARRISON, Burton Norville, American lawyer: b. New Orleans, 1836; d. Washington, D. C., 29 March 1904. He was graduated from Yale in 1859, shortly afterward became professor of mathematics and astronomy in the University of Mississippi, and at the outbreak of the Civil War was appointed private secretary to Jefferson Davis, President of the Confederate States. Captured with Davis, he remained in imprisonment until January 1866, when his release was effected by the intervention of F. P. Blair and President Johnson. Subsequent to the war he followed the law in the North with much success.

HARRISON, Mrs. Burton. See HARRISON, CONSTANCE CARY.

BENJAMIN HARRISON

Twenty-third President of the United States

HARRISON, Carter Henry, American politician: b. Elk Hill, Fayette County, Ky., 15 Feb. 1825; assassinated, Chicago, 28 Oct. 1893. He was graduated from Yale in 1845, from the Transylvania University Law School (Lexington, Ky.), in 1855, and in the latter year was also admitted to the bar and removed to Chicago. There he invested in real estate, in 1869 was defeated as a candidate for State senator on the Democratic ticket, but in 1871 was elected county commissioner of Cook County, and in 1874 was sent to Congress from the second Illinois district, and in 1876 re-elected. In 1879 he was elected mayor of Chicago, and again in 1881, 1883, 1885 and 1893. He was also an unsuccessful independent candidate in 1891. In 1891 he purchased the Chicago *Times,* in the direction of which he was active until his election as mayor in 1893. In several instances his mayoralty contests assumed national interest, particularly so that of 1893 — the «World's Fair year» — when the success of the great exposition was thought to depend much upon the occupant of the mayor's chair. He was opposed by the united Citizens' and Republican forces and by nearly the entire press of Chicago, but after a vigorous campaign of public meetings was elected by more than 21,000 majority. He wrote ‘A Race with the Sun’; and ‘A Summer Outing.’

HARRISON, Carter Henry, American politician: b. Chicago, 23 April 1860. He is son of the preceding. He graduated from Saint Ignatius College, Chicago, in 1881, and from the Yale Law School in 1884. He practised law in Chicago, was later engaged in the real estate business, and in 1891 became editor of the Chicago *Times,* a position which he held for two years. He has been active in Chicago politics as a Democrat, and has been five times elected mayor of the city, in 1897, 1899, 1901, 1903 and 1905.

HARRISON, Constance Cary, American novelist and miscellaneous writer: b. Vaucluse, Va., 25 April 1846. She was married in 1867 to Burton N. Harrison (q.v.) and has since lived in New York. She is one of the most popular of American authors and among her published books are ‘Woman's Handiwork in Modern Homes’ (1881); ‘Old-Fashioned Fairy-Book’ (1884); ‘Bar Harbor Days’ (1887); ‘The Anglomaniacs’ (1887); ‘Sweet Bells Out of Tune’ (1893); ‘An Errant Wooing’ (1895); ‘A Bachelor Maid’ (1894); ‘A Son of the Old Dominion’ (1897); ‘A Merry Maid of Arcady’ (1897); ‘Good Americans’ (1898); ‘A Princess of the Hills’ (1901); a play, ‘The Unwelcome Mrs. Hatch’ (1901); ‘Transplanted Daughters’ (1909); ‘Recollections, Grave and Gay’ (1911).

HARRISON, Frederic, English philosopher and historian: b. London, 18 Oct. 1831. He was educated at Oxford, and was called to the bar at Lincoln's Inn in 1858. From 1877–89 he was professor of jurisprudence and international law at the Inns of Court. He is the chief living exponent in England of Positivism, and was president of the English Positivist Committee, 1880–1905. He is a master of English style, and his literary judgments command the fullest respect despite the fact that he has written on a wide range of subjects. Among his publications are ‘The Meaning of History’ (1862); ‘Social Statics’ (1875); ‘The Present and the Future’ (1880); ‘The Choice of Books’ (1886); ‘Oliver Cromwell’ (1886); ‘Memories and Thoughts’ (1906); ‘The Creed of a Layman’ (1907); ‘My Alpine Jubilee’ (1908); ‘Autobiographic Memoirs’ (1911); ‘Among My Books’ (1912); ‘The Positive Evolution of Religion’ (1912); ‘The German Peril’ (1915).

HARRISON, Gabriel, American author and artist: b. Philadelphia, 25 March 1825; d. Brooklyn, N. Y., 15 Dec. 1902. He began life as a photographer and an actor and in 1845 supported Charles Keane at the Park Theatre, New York, and later taught elocution and wrote dramatic and art criticism. He opened the Park Theatre in Brooklyn in 1863. Among his works are ‘Life of John Howard Payne’ (1873); dramatization of ‘The Scarlet Letter’ (1878), etc. Much of his leisure was given to art, and he was an amateur painter of no mean ability. He did much to assist the progress of the free art schools in Brooklyn.

HARRISON, James Albert, American philologist: b. Pass Christian, Miss., 21 Aug. 1848; d. 1911. He was graduated at the University of Pennsylvania in 1868; and has since been professor of Latin and modern languages at Randolph-Macon College, Va., 1871–76; of English and modern languages at Washington and Lee University 1876–95, and of English and romance languages at the University of Virginia. He was a prominent member of the American Philological Association and the founder and editor of the ‘Library of Anglo-Saxon Poetry.’ Among his works are ‘Group of Poets and Their Haunts’ (1881); ‘Story of Greece’ (1885); ‘Dictionary of Anglo-Saxon Poetry’ with Baskerville (1886), etc. He was on the editorial staff of both the *Century* and *Standard* Dictionaries.

HARRISON, Joseph, American engineer: b. Philadelphia, 20 Sept. 1810; d. there, 27 March 1874. In 1834 he began the construction of locomotives, and in 1840 designed for the Reading Railway an engine which was copied and introduced into Russia with such success that he was invited to Russia, and there with two other American engineers concluded a contract with the Russian government to build the rolling-stock and locomotives of the Saint Petersburg and Moscow Railway. He executed also other important contracts with that government, and in 1852 returned to the United States, where he subsequently patented a safety-boiler and received both the gold and silver Rumford medals from the American Academy of Arts and Sciences. In 1869 he published a folio containing his autobiography, incidents of his Russian experience and his poem, ‘The Ironworker and King Solomon.’ Another valuable work from his pen is ‘The Locomotive Engine’ (1872).

HARRISON, Lovell Berge, American artist: b. Philadelphia, 28 Oct. 1854. He studied with Alexander Cabanel in Paris, became known for his landscapes, especially snow-scenes, and obtained medals at the Paris Salon of 1887 and the Columbian Exposition (1893). His works include ‘Friends, or Foes?’; ‘A Waif from the Sea’; ‘Calling Home the Cows’; and ‘November,’ purchased by the

French government for the Marseilles Museum; ‹The Flatiron Building in a Blizzard›; ‹Fifth Avenue at Twilight.›

HARRISON, Mary St. Leger («LUCAS MALET»), English novelist: b. Eversley, Hampshire. She is a daughter of Charles Kingsley (q.v.), and was married to Rev. William Harrison, rector of Clovelly, who died in 1897. She inherits the talent of the Kingsleys and her novels published under the pseudonym of «Lucas Malet» have been as widely popular in America as they are in England. They are marked by vigorous characterization and skilful construction, and include ‹Colonel Enderby's Wife› (1885); ‹The Wages of Sin,› a notably strong tale (1891); ‹The Carissima› (1896); ‹The Gateless Barrier› (1900); ‹Sir Richard Calmady› (1901); ‹The Far Horizon› (1906); ‹The Golden Galleon› (1910); ‹Adrian Savage› (1911); ‹Wisdom of Damaris› (1915).

HARRISON, Thomas Alexander, American painter: b. Philadelphia, 17 Jan. 1853. He is a brother of Lovell Berge Harrison, and studied painting under Gérôme in the École des Beaux Arts at Paris, and first exhibited in the Salon of 1881. He was awarded the gold medal by the Pennsylvania Academy of Fine Arts in 1894 and elected an associate of the National Academy in 1898. His best-known works are ‹Coast of Brittany›; ‹Little Slave›; ‹The Sea-Shore.› He has exhibited in many of the finest galleries and collections of both hemispheres.

HARRISON, Thomas Skelton, American diplomat and manufacturer: b. Philadelphia, 19 Sept. 1837. He was educated at the Classical Academy of John W. Faries, and at business colleges. He was acting paymaster of the United States navy from 1861 to 1864, and member of the firm of Harrison Bros. and Company from 1864 to 1897. In the latter year he was appointed diplomatic agent and consul-general to Egypt. He has been prominent in political reform movements in Philadelphia, and was member of the Committee of 100. He is member of many historical and antiquarian societies; was twice decorated by Khédive of Egypt, last time with grand cordon of the Imperial Order of Medjidia.

HARRISON, William Henry, 9th President of the United States: b. Berkeley, Charles County, Va., 9 Feb. 1773; d. Washington, D. C., 4 April 1841. He studied at Hampden and Sidney College, later pursued a course in medicine, and was about to be graduated as a practitioner, when the sudden death of his father gave him the liberty to disengage himself from a profession for which he had no natural bent nor aptitude. He received from Washington a commission in the army, and was soon on his way to Cincinnati, making the journey from Philadelphia to Pittsburgh on foot, to join the regiment to which he had been assigned. He arrived at Fort Washington just after the defeat of General St. Clair's army. His first military service was to command a company of 20 men as an escort for a train of pack-horses to Fort Hamilton, a military post on the west bank of the Big Miami River from which the seat of Butler County was named. In 1793 he joined the new legion under Gen. Anthony Wayne who made him an aide-de-camp, and in December of that year he took part in the expedition which repossessed General St. Clair's field of battle, and erected thereon Fort Recovery. He participated in all the engagements with the Indians and their British allies during this campaign, and displayed conspicuous gallantry at the battle of Fallen Timbers. Shortly after the close of this campaign Harrison was advanced to the rank of captain and placed in command of Fort Washington. The position was largely a confidential one. The conduct of the Spaniards on the Mississippi was exasperating. French citizens and agents were engaged in exciting the people of Kentucky into a war with the Spanish of Louisiana with the object of embroiling our government with Spain and of forcing it into a league with France. Captain Harrison was instructed to prevent the passage down the river of boats laden with military stores belonging to the French agents. The English posts on the northern frontier, which had been held so long in violation of good faith, were now evacuated by the English in obedience to the Jay Treaty of 1794; the new garrison and supplies were sent to Fort Washington and forwarded thence through the wilderness under the supervision of the commandant of that post. In the spring of 1798 Harrison resigned his commission in the army and settled on a tract of land at North Bend about 16 miles from Cincinnati, but was immediately appointed by President John Adams as secretary of the Northwest Territory under Gen. Arthur St. Clair as governor. A year later he resigned this position to take his seat in Congress as the first delegate from the Territory. Up to this time the public lands had been sold in such vast tracts that none but men of wealth could buy them. Harrison secured the division of the land into small tracts and made it possible for the poor man to obtain a homestead. During that session of Congress a part of the Northwest Territory was formed into the Territory of Indiana. It included the present States of Indiana, Illinois, Michigan, Wisconsin and a part of Minnesota, and contained a civilized population of nearly 5,000 souls. Harrison was appointed its first governor by President Adams, and so satisfactory was his administration that he was successively reappointed by President Jefferson and President Madison. He was also made superintendent of Indian affairs. Governor Harrison organized the new government at Vincennes. Many difficult questions demanded his attention, but the most difficult and delicate was the restless and finally hostile attitude of the savages under the leadership of Tecumseh, and the preaching of Tecumseh's brother, «the Prophet.» The beginning of open warfare by the Indians was averted many times by his calmness and courage. He made in all 13 treaties with the Indians, and secured the cession from several tribes of more than 3,000,000 acres of land on the Wabash and White rivers. Tecumseh condemned these treaties on the ground that the land belonged to all of the Indians, and that a single tribe could not give a legal title without the consent of every other tribe. Harrison invited Tecumseh to Vincennes for a conference, and directed that he should bring with him not more than

WILLIAM HENRY HARRISON

Ninth President of the United States

30 warriors; but he came with 400 completely armed. There were many evidences that treachery was intended, and but for the conciliatory methods of the governor, the council would have terminated in bloodshed. Nothing was accomplished by this interview, nor by a second in the following summer. Meanwhile, frequent depredations by the Indians made it evident that conciliatory measures could no longer be employed, and on 26 Sept. 1811, Harrison set out with 900 men to punish them. On 6 November, when the army was within a short distance of Tippecanoe, it was met by messengers demanding a parley. A council was agreed upon for the next day, but at 4 o'clock on the following morning, the treacherous savages fiercely attacked the camp of Harrison in an endeavor to take it by surprise. The fighting continued till daylight when the Indians were routed with great loss. In the War of 1812 Harrison was appointed to the chief command of the Northwest, and given a major-general's commission. He urged upon the government the importance of creating a navy on the Lakes. That advice was heeded, and the splendid achievement of Commodore Perry on 10 Sept. 1813 was made possible by the military sagacity of this accomplished soldier. Six days after Perry's victory General Harrison embarked his artillery and supplies for a descent on Canada. The British general, Proctor, burned the fort and navy-yard at Malden and retreated, closely pursued by Harrison who overtook him and his Indian allies led by Tecumseh near the river Thames. Within five minutes almost the whole British force was captured, and shortly afterward the Indians were completely routed, and their leader, Tecumseh, was slain. The battle of the Thames and Perry's victory ended the war in Upper Canada, and gave the United States undisputed possession of the Great Lakes, excepting Lake Ontario.

The years between the War of 1812 and the presidential campaign of 1840 Harrison devoted in part to the service of his country and in part to the life of a country gentleman. He was in turn a member of Congress, State senator in the general assembly of Ohio, presidential elector, United States senator from Ohio and Minister to the United States of Colombia. In 1829 he retired to his farm at North Bend. In December 1839 he was nominated by the National Whig convention for the Presidency of the United States, with John Tyler of Virginia for Vice-President. The campaign which followed was one of the most exciting in the history of the country. Political mass meetings and processions were introduced for the first time, and party watchwords and emblems were employed with telling effect. That canvass has commonly been called the "log cabin and hard cider campaign." The eastern end of General Harrison's house at North Bend consisted of a log cabin covered with clapboards, and his table was reputed to be well supplied with good cider, instead of wines. Log cabins and hard cider thus became party emblems typifying republican simplicity. "Tippecanoe and Tyler too" was shouted and sung and emblazoned from one end of the country to the other. Nothing could stem the tide of wonderful popular enthusiasm for the hero of Tippecanoe and the Thames. Van Buren, the Democratic candidate, received only 60 electoral votes out of 294. The death of the President occurred only 31 days after his inauguration. Consult Bostwick in Wilson's 'Presidents of the United States' (1894); Wiley, E., and Rines, I. E., 'The United States' (New York 1916).

George Edwin Rines.

HARRISON, Ark., town, county-seat of Boone County, on the Saint Louis & N. A. Railroad, about 120 miles northwest of Little Rock. It is in the lead and zinc section, and its industries are chiefly connected with mining. Considerable fruit is grown in the vicinity, and it has flour-milling and dairy interests. It is the seat of a collegiate and normal institute for women. The United States government building cost about $80,000. Pop. 1,602.

HARRISON, N. J., city in Hudson County, on the Passaic River, the Pennsylvania and the Erie railroads. It is a suburb of Newark, and a sub-station of the Newark post-office, but has an independent municipal government. It was settled in 1668 and incorporated in 1873. The charter of 1873 is still in force, and by it the government is vested in a common council elected by wards. The chief manufactures are wire-cloth, marine-engines, steel, machinery, tubes, refrigerators, ink, beer and leather. The water-plant is owned and operated by the city. Pop. 14,498. Now increased to 17,000.

HARRISON, Ohio, village in the township of Harrison, Hamilton County, on the boundary between Ohio and Indiana, and on the Cleveland, C., C. & Saint L. Railroad, 23 miles by rail west-northwest of Cincinnati. The village situated on the north bank of the Whitewater River, a tributary of the Great Miami, in a fertile farming section, has manufactures of furniture, sashes, blinds, brushes, bricks, shoes, a corn-drill factory, a cannery and lumber, flour and roller mills. Its public buildings include a high school and six churches. Pop. 1,368.

HARRISONBURG, Va., town, county-seat of Rockingham County, on the Chesapeake & W., the Southern and the Baltimore & Ohio railroads, about 100 miles northwest of Richmond. It is in the Shenandoah Valley, and is surrounded by a rich agricultural country. Its chief manufactures are flour, staves, saw and planing mill products, foundry and machine shop products and pottery. It is the trade centre for the greater part of the county. The town owns and operates the waterworks and electric-lighting systems. Pop. 4,879.

HARRISONBURG, Engagement Near. Harrisonburg, Va., on the Great Valley Turnpike, 22 miles north of Staunton, and 122 miles northwest of Richmond, was the scene of many stirring events in the Civil War. The place was occupied by General Banks late in April 1862, and abandoned when Jackson forced Banks down the valley in May. When Jackson in turn was forced up the valley by the combined armies of McDowell and Frémont, he abandoned the main valley, moving from Harrisonburg to Cross Keys and Port Republic, his rear-guard, two regiments of Virginia cavalry, under Gen. Turner Ashby, halting about two miles southeast of Harrisonburg. On 6

June 1862 Colonel Wyndham, with the First New Jersey Cavalry and a battalion of the Fourth New York, moving from Harrisonburg, attacked Ashby and was defeated and followed to within one mile of the town, with the loss of several men killed and wounded, and about 60 taken prisoners, including Wyndham himself. General Bayard then pushed forward with cavalry and infantry and Ashby fell back and called for infantry support. Jackson sent him Stuart's brigade — First Maryland, Forty-fourth, Fifty-second and Fifty-eighth Virginia. A few miles beyond Harrisonburg Bayard attacked with the Pennsylvania «Bucktails» under command of Lieut.-Col. T. L. Kane, and in the engagement Ashby was killed, and Kane was wounded and captured. While this was happening on the right, the Sixteenth Ohio Infantry and First Pennsylvania Cavalry, on the left, drove in the Confederate skirmish-line, without loss on either side. As soon as the wounded could be removed the Confederates fell back in the direction of Port Republic, and the Union forces retired to Harrisonburg. The Union loss in the engagement was 65 killed, wounded and missing. The Confederate loss, including Ashby, was 18 killed, 50 wounded and 3 missing. Consult 'Official Records' (Vol. XII).

E. A. CARMAN.

HARRISONVILLE, Mo., city, county-seat of Cass County, on the Missouri, K. & T., and the Missouri P. railroads, about 30 miles southeast of Kansas City. It is situated in an agricultural and stock-raising region and the trade and manufactures are connected chiefly with the products of the surrounding farms. The shipping consists mostly of grain, live-stock, lumber and dairy products. The electric-lighting plant is municipally owned. Pop. 1,947.

HARRISSE, har-ēs', **Henri**, American critic, bibliographer and historian: b. Paris, 1830, of Russian-Hebrew parentage; d. 1910. He became a citizen of the United States, and for several years practised law in New York. He has published 'Bibliotheca Americana Vetustissima,' embracing works published 1492–1551 (1866); 'Christopher Columbus' (1884–85); 'John and Sebastian Cabot' (1883); 'The Discovery of North America'; 'The Cortes Real' (1883); 'Discovery of Newfoundland' (1900). Consult 'Life' by Cordier (1912).

HARRODSBURG, Ky., city, county-seat of Mercer County, on a branch of the Southern Railroad, about 45 miles southwest of Lexington and 38 miles southeast of Louisville. It is the oldest permanent settlement in the State, and was founded by James Harrod in 1774. Two years later Kentucky was incorporated as one of the counties of Virginia and Harrodsburg was made the county-seat. Stock-raising and farming are the principal occupations in the surrounding country. It has flour and planing mills, a distillery, brickyard and ice factory. The climate, scenery and the Greenville Springs nearby make it a pleasure and health resort. It is the seat of Beaumont College, an institution for women, opened in 1894. It is governed by a commission; water and lighting services are municipally owned. Pop. 3,147.

HARROW SCHOOL, England, an academic institution situated at Harrow-on-the-Hill, a town of Middlesex, 12 miles northwest of London. It is one of the famous public schools of England and was founded by John Lyon in 1571. The original red brick schoolhouse, now the Fourth Form School, was built 1608–15. New buildings were added in 1819 and since, the chief of these being the Vaughan Memorial Library (1863), and the semi-circular speech-room (1877). The school was primarily intended to afford free education to 30 poor boys of the parish; but provision was also made for the admission of «so many foreigners as the place can conveniently contain.» The age of admission is 12 to 14; and there are six entrance scholarships of from $150 to $400 per annum, offered every Easter. The most valuable learning scholarships are Baring's three of $500 a year for five years to Hertford College, Oxford. Among the distinguished alumni of Harrow are Dr. Parr, Theodore Hook, Sheridan, Byron, Palmerston, Anthony Trollope and Cardinal Manning. Under the Public Schools Act of 1868 the governing body comprises six members, elected respectively by the Lord Chancellor, the universities of Oxford, Cambridge and London, the Royal Society and the undermasters.

HART, Albert Bushnell, American educator and historian: b. Clarksville, Pa., 1 July 1854. He was graduated at Harvard in 1880, subsequently becoming professor of history and then of government there. He was joint editor of the *Harvard Graduates' Magazine*, 1894–1902; of the *American Historical Review*, 1895–1909. He was president of the American Historical Association in 1909, and of the American Political Science Association in 1912. He has written 'Introduction to the Study of Federal Government' (1890); 'Epoch Maps' (1891); 'Formation of the Union' (1892); 'Practical Essays on American Government' (1893); 'Studies in American Education' (1895); 'Guide to the Study of American History,' with Edward Channing (1897); 'Salmon Portland Chase' (1899); 'Foundations of American Foreign Policy' (1901); 'Actual Government' (1903); 'Essentials of American History' (1905); 'Slavery and Abolition' (1906); 'National Ideals Historically Traced' (1907); 'Southern South' (1911); 'War in Europe' (1914); 'Monroe Doctrine' (1915); 'National Progress' (1917); 'School History of the United States' (1918). He has edited 'Epochs of American History' (3 vols., 1891–96); 'American History Told by Contemporaries' (4 vols., 1898–1901), etc. He was appointed exchange professor of Harvard with the University of Berlin in 1915.

HART, Ernest A., English physician and editor: b. London, 26 June 1835; d. London, 7 Jan. 1898. He chose medicine as his profession, and made the diseases of the eye his speciality with much success. He found time to coedit the *Lancet* (1858), and to edit the *British Medical Journal* (1866). Surgeon at the West London and later at Saint Mary's Hospital, he became dean at the medical school attached to the latter and wrote numerous valuable papers, society and hospital reports. In the field of sanitary legislation, his influence was very helpful; he originated many plans to reform public evils, being associated with various movements for 30 years to promote the national health. He was severe in his exposure of medical shams and was editing a series of biographies ‘Masters of Medicine’ on his death. He wrote ‘The Mosaic Code’ (1877), an exposition of its sanitation laws.

HART, James McDougal, American painter: b. Kilmarnock, Scotland, 10 May 1828; d. 1901. He came to the United States in 1831, and studied art under his brother William (q.v.), and at Düsseldorf in the studio of Schirmer (1851). He was elected a member of the National Academy in 1859, and devoted himself principally to American forest scenery with a preference for autumnal effects. His ‘Landscape with Cattle’ is in the New York Metropolitan Museum, and his best-known pictures are ‘On the Croton’; ‘Morning in the Adirondacks’ and ‘Oaks in Autumn.’

HART, James Morgan, American philologist: b. Princeton, N. J., 2 Nov. 1839; d. 18 April 1916. He was graduated from Princeton in 1860, studied in Göttingen and took the degree of A.M. from Princeton in 1863. He was professor of modern languages at Cornell (1868–72); professor of modern languages and English literature in the University of Cincinnati (1876–90); returning to Cornell as professor of English in 1890. He retired as professor emeritus in 1907. He has written ‘German Universities’ (1874); ‘Syllabus of Anglo-Saxon Literature’ (1878); ‘Hand-book of English Composition’ (1895); ‘Essentials of Prose Composition’ (1902); ‘Standard English Speech in Outline’ (1907); has revised and edited his father's ‘Manual of Composition and Rhetoric’ (1897); and has edited four volumes of German Classics — ‘Herman and Dorothea’ (1875); ‘Piccolomini’ (1875); ‘Prose Selections’ from Goethe (1876); ‘Faust Part I’ (1878); De Quincey's, ‘The English Mail Coach,’ ‘Joan of Arc’ (1893); also a translation of Franz Dingelstedt's novel ‘The Amazon’ (1868); and ‘Cavé on Colour,’ from the French.

HART, Joel T., American sculptor: b. Clarke County, Ky., about 1810; d. Florence, Italy, 2 March 1877. He was of humble parentage, and in 1830 entered a stone-cutter's establishment in Lexington. He was induced to attempt modeling busts in clay, and among others, General Jackson and Cassius M. Clay (q.v,) sat to him, the latter giving him his first commission for a bust in marble. This when completed proved so satisfactory that Hart was commissioned to execute a marble statue of Henry Clay. He began this, but various delays prevented its completion, and it was not set up in Richmond, Va., till 1859. Other important works by Hart are ‘Woman Triumphant’ in the courthouse, Louisville, Ky., and ‘Il Penseroso.’ He was particularly well known for his portrait busts.

HART, John, American patriot: b. Hopewell, N. J.; d. there, at an advanced age, 1780. Frequently elected to the colonial assembly he was prominent especially in the legislation for local improvements. In 1774 he was chosen to the general Congress at Philadelphia, where he was noted for his sound judgment and inflexible determination; was re-elected in the two following years, and was one of the signers of the Declaration of Independence. New Jersey was soon invaded by the British army, his estate devastated and special exertions were made to take him prisoner. The capture of the Hessians by Washington permitted his return home.

HART, Sir Robert, inspector-general of the Chinese imperial customs: b. Millburn, County Armagh, Ireland, 1835; d. 21 Sept. 1911; He was educated at Taunton Wesleyan School, and graduated at Queen's College, Belfast. He entered the British consular service in China in 1854, was appointed inspector-general of customs in 1863, making only three visits to Europe between that date and 1902. During the Boxer outbreak in 1900, he underwent the siege in the British legation at Peking. His prolonged residence in China enabled him to look at things from the Chinese standpoint, which he embodied in his remarkable work, ‘These From the Land of Sinim’ (1901). In 1906 the action of the Chinese government in making appointments which would have placed him in a subordinate position was followed by his resignation. Honors were from time to time bestowed upon him by both the Chinese and the British governments. He possessed in a singular degree the confidence of the Chinese authorities, his high integrity making him an ideal administrator.

HART, Samuel, American Episcopal clergyman: b. Saybrook, Conn., 4 June 1845. He was graduated from Trinity College in 1866, and was ordained priest of the Episcopal Church in 1870. He was at Trinity College as assistant professor of mathematics (1870–73), professor of mathematics (1873–83) and professor of Latin (1883–99). In 1899 he became vice-dean and professor of doctrinal theology and liturgics at Berkeley Divinity School; and in 1908 he was elected dean. In 1874 he was appointed registrar of the diocese of Connecticut, in 1886 custodian of the Standard Prayer Book of the Episcopal Church of the United States, in 1892 secretary of the House of Bishops and in 1896 historiographer of the Church. He is president of the Connecticut Historical Society and a member of several other learned societies, including the American Antiquarian Society, the American Oriental Society and the Society of Biblical Literature and Exegesis. He is editor of ‘Satires of Juvenal,’ ‘Satires of Persius’ and Bishop Seabury's ‘Communion Office,’ and author of a volume on the American Prayer Book, of ‘Faith and the Faith’ (Bohlen Lectures 1914), and of ‘The Witness of the Church’ (Paddoch Lectures 1916).

HART, Thomas Norton, American merchant and politician: b. North Reading, Mass., 20 Jan. 1829. He entered business in Boston as partner in a mercantile firm, later founding a firm under the name of Hart, Taylor & Co. When he withdrew from this business he became president of the Mount Vernon National Bank, and was connected with many eleemosynary institutions. He has also been active in politics, was a member of the common council and of the board of aldermen; was nominated for mayor of Boston in 1887 and 1888, but defeated at the election; was, however, elected in 1889, 1890, 1900 and 1901, and was postmaster of Boston in 1891–93.

HART, William, American painter: b. Paisley, Scotland, 31 March 1823; d. Mount Vernon, N. Y., 17 June 1894. Emigrating with his parents to the United States in 1831, he settled in Albany, and was at first apprenticed to a firm of coachmakers, in Troy, by whom he was employed to paint the panels of coaches. He subsequently painted landscapes, portraits and even window shades. In 1848 he became a regular exhibitor at the National Academy of Design, of which in 1858 he was elected as academician. He was president of the American Water Color Society 1870–73. He was a brother of James McDougal Hart (q.v.).

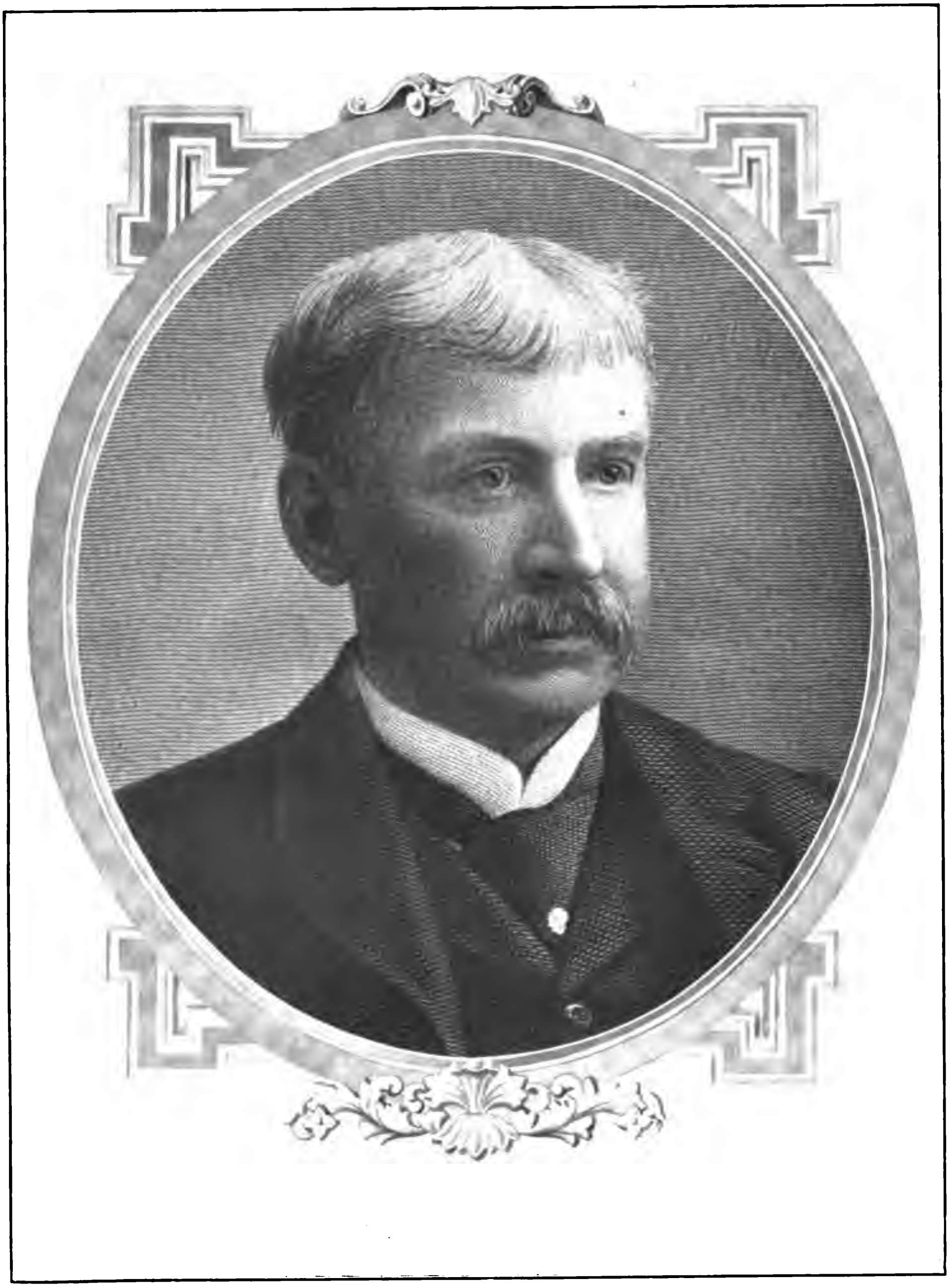
HART, a hunting term, applied to the male, or stag, of the red deer after it has completed its full antlers at the age of six or seven years.

HARTBEEST, härt'bēst, one of the large African antelopes of the genus *Bubalus,* specifically the caama (*B. cama*), formerly excessively numerous on the South African plains. They have long narrowing heads, doubly curved, ringed horns, cow-like tails and usually are of a grayish or reddish color, with decided markings on the face, especially in the bontebok (*B. pygargus*), blesbok (*B. albifrons*) and sassaby (*B. lunata*). All were noted for swiftness. Other very distinctive species are the konzi, tora, korigum and hunter's antelope. Most of these have become greatly diminished in numbers since about 1870.

HARTE, Francis Bret, American novelist and poet: b. Albany, N. Y., 25 Aug. 1839; d. Aldershot, England, 6 May 1902. In 1854 he went to California, attracted there by the gold excitement. He was first a teacher at Sonora, then tried mining, in which he was unsuccessful. He next entered a printing office, and in 1857 was compositor on the San Francisco *Golden Era.* At that time he began to write short sketches, which appeared in the *Golden Era,* and soon attracted attention; he was invited to join the staff of the *Californian,* to which he contributed a series of clever parodies on famous contemporary writers of fiction, later published as 'Condensed Novels.' In 1864 he was appointed secretary to the United States branch mint; in 1868 became editor of the *Overland Monthly,* for which he wrote 'The Luck of Roaring Camp' and others of his most successful stories of frontier life. In 1871 he went to New York and became a regular contributor to the *Atlantic Monthly.* In 1878 he was appointed United States consul in Crefeld, Germany, and in 1880 received the consulship at Glasgow, Scotland. In 1885 his tenure of office as consul came to an end and he settled in London, devoting his whole time to literary work. He was a prolific writer and continued for the most part to deal with California themes. Among his shorter stories the following may be mentioned: 'Miggles'; 'The Outcasts of Poker Flat'; 'M'Liss' (1872); 'The Twins of Table Mountain' (1879); 'An Heiress of Red Dog' (1879); 'Flip' (1882); 'On the Frontier' (1884); 'By Shore and Sedge' (1885); 'Devil's Ford' (1887); 'A Phyllis of the Sierras,' and 'A Drift from Redwood Camp' (1888); 'The Heritage of Dedlow Marsh' (1889); 'A Sappho of Green Springs' (1891); 'The Bell-Ringer of Angel's' (1894); 'A Protégé of Jack Hamlin's' (1894); 'Barker's Luck' (1896); 'Tales of Trail and Town' (1898); 'Stories in Light and Shadow' (1898); 'Mr. Jack Hamlin's Mediation' (1899); and 'From Sand Hill to Pine' (1900), a collection of short stories. His longer stories and novels include 'Tales of the Argonauts' (1875); 'Gabriel Conroy' (1876); 'Thankful Blossom: A Romance of the Jerseys' (1877); 'In the Carquinez Woods' (1883); 'Maruja' (1885); 'Snowbound at Eagle's' (1886); 'The Crusade of the Excelsior' (1887); 'Cressy' (1889); 'A Waif of the Plains' (1890); 'A Ward of the Golden Gate' (1890); 'A First Family of Tasajara' (1892); 'Colonel Starbottle's Client and Some Other People' (1892); 'Clarence' (1895), dealing with incidents in the American Civil War; 'In a Hollow of the Hills' (1895); and 'Three Partners' 1897). He also wrote much verse comprised in volumes entitled 'Poems' (1871); 'East and West Poems' (1871); 'Echoes of the Foot-Hills' (1874); and 'Some Later Verses' (1898). See TALES OF THE ARGONAUTS.

In estimating Harte's work it must be remembered that it was his rare good fortune to break new ground and to become the first literary interpreter of a life which with its primitive breadth and freedom, its striking contrasts of circumstance and character, offered singular opportunities to the novelist. That he ever did anything quite so good as his first group of stories and poems cannot be said, for his later volumes are marked, as a whole, by the repetition of well-worn motives and by declining spontaneity and power. Still, the average quality of his output remained high. Among qualities of his work those which perhaps most constantly impress the critical reader are his dramatic instinct, his keen insight into character, his broad sympathy and his subtle and pervasive humor. Dealing for the most part with large, strongly marked, elemental types, as these develop and express themselves under conditions which give free play to instinct and passion, he does not indulge in lengthy analyses or detailed descriptions. His men and women are sketched with a few strokes and left to work out their own personalities in speech and deed; and yet, such is the skill with which this is accomplished that they stand out before us as creatures of real flesh and blood. He did not purposely soften the shadows in his pictures; the sin and wretchedness of frontier life are frankly portrayed; none the less, there can be little doubt that consciously or unconsciously he contrived to throw an idealizing glamour over the mine and the camp and that many of his most lifelike and successful characters are wrought in the imagination, though out of the stuff of fact. But it is here that we touch upon what is perhaps one of the finest qualities of his work — a quality not to be separated from his tendency toward idealization. Though he dwelt habitually upon life's unexplained and inexplicable tragic complexities, he nevertheless suffused his stories with an atmosphere of charity, clear, sweet and wholesome. Consult Kozlay, 'Stories, Poems and Other Uncollected Writings of Bret Harte' (1914); Merwin, 'Life of Bret Harte' (1911).

GEORGE EDWIN RINES.



BRET HARTE

HARTFORD, Conn., State capital, seat of Hartford County, port of entry, head of navigation on Connecticut River, 60 miles by water from Long Island Sound. Its steam railroad lines, all owned by the New York, New Haven & Hartford system, run in seven directions, making it the greatest inland railroad centre in the Atlantic States save two. By the main line it is 110 miles to New York and 124 to Boston (a midway position which has enhanced its business, social and cultural development), 36 to New Haven, 26 to Springfield, Mass.; by the old New York & New England lines, on the Highland Division 110 to Fishkill on the Hudson and 90 to Providence, R. I., and via Willimantic 117 to Boston; the Valley Division skirts the river nearly to its mouth (44); the Connecticut Central runs to Springfield by the east side of the river; the Central New England to Poughkeepsie (109) and beyond to Erie and Lehigh connections. Its electric suburban lines, mostly under the same ownership (as is the city system), extend without change to Springfield (a line each side of the river), Rockville (17); Middletown (16); and Bristol, via New Britain (21); besides Unionville (13); Rainbow (12); and South Glastonbury (10); and a line to Norwich (about 38) is under construction. Permanent pop. about 120,000.

Hartford lies on the west bank of the river (which divides it from East Hartford), on rolling ground. The first real hills are the Talcott Mountain Range, half a dozen miles west; but the elevations of Prospect avenue in the western part of the city and Fairfield avenue in the southern afford a superb view across the entire Connecticut Valley, some 20 miles wide. It extends about five and one-half miles north and south to Windsor and Wethersfield lines, by three and one-half west to West Hartford line, about 18 square miles in all; the town and city are conterminous. It is divided about equally by the little Park River, which joins the Connecticut just south of the centre and is crossed by many bridges, whose dams afford large water power, and through whose bed runs the great main sewer into the Connecticut. The chief business street is Main, the original highway to Windsor and Wethersfield, following the river line along the first high ground, the banks of old being widely overflowed in the spring freshets; next State, east from Main to the steamer landing with the chief tobacco and other wholesale warehouses, opening at Main into a wide flare — formerly the market square for country produce teams, now containing the central trolley station — and paralleled on the south with Central Row, a block long; between them lying the old State House (later till recently the city hall) with the post-office building in the rear; then Asylum opposite State, running west past the railroad station, and Pearl parallel opposite Central Row, joining Asylum at its foot by Ford; and Pratt parallel for a block on the north as far as Trumbull, western parallel to Main, from Park River to North Main, whose section from Pearl to Pratt is of rising importance; Church next north of Pratt, just widened 10 feet, is fast assuming business consequence.

It is a place of remarkable beauty in business and public structures, parks and (relatively to its size) unmatched extent of handsome residential streets. Of the latter, with some handsome places on Wethersfield avenue (the chief, Samuel Colt's of firearms fame, is now by his widow's legacy a home for old ladies), the most distinguished are Washington street with its magnificent arch of old elms; western Asylum avenue and correspondent Farmington avenue, with Woodland across the end; and Prospect avenue (north) — the West Hartford boundary, and long built up only on that side to escape Hartford taxes, a reason now obsolete — the most coveted street for new social magnates. Woodland for many years held that position, and the square from it to Forest between the avenues was the pinnacle of social desire; aided by the fact that Mark Twain, Harriet Beecher Stowe, Gen. J. R. Hawley, Charles Dudley Warner and William Gillette had each a house on Forest or the avenue near by. (The costliest place in the city, the granite "palace" of J. P. Morgan's relatives, the Goodwins, is at Woodland and Asylum; but their and other landholdings north left few vacant sites). This position has now been transferred to the section west of Park River beyond Woodland to Prospect avenue, with handsome places extending well into West Hartford; though the edges of Keney Park are drawing in a good class, and there are very many other fine streets and individual dwellings.

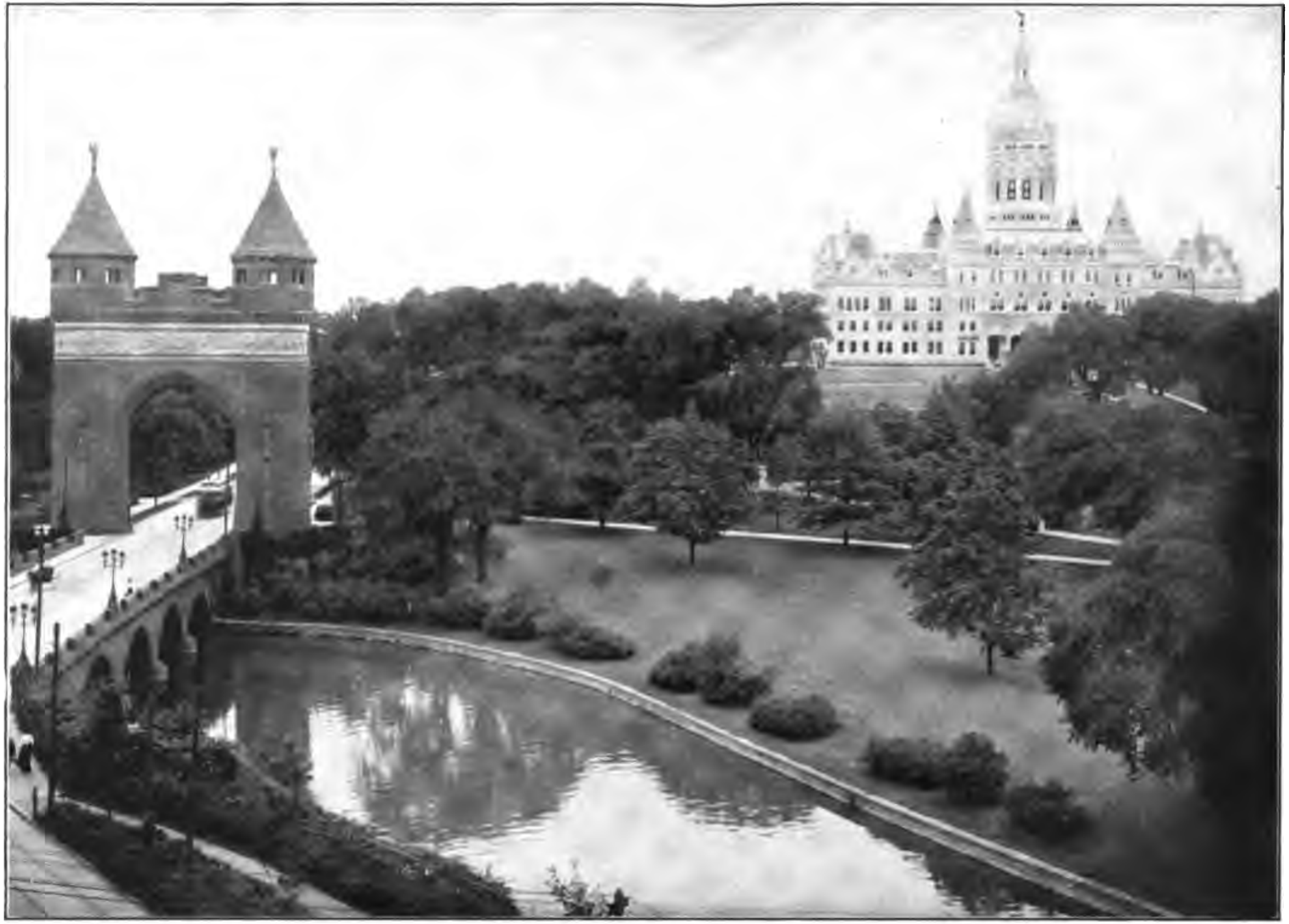
The Connecticut is spanned by a superb granite bridge at Morgan street, finished in 1907, the largest in mass of any purely stone bridge in the world, and one of the greatest masses of cut stone of any kind. It has nine spans, and is 1,192.5 feet long, 82 feet wide (London Bridge is 42) with a clear roadway of 80 feet including 10-foot sidewalks, and its arches 45 feet above mean low water, with foundations 50 feet below. All above water is dressed and carved in graceful forms. Its cost was about $1,600,000 by itself; but attendant improvements, including a broad boulevard to State street along the river front, raised it to nearly $3,000,000.

The park system contains above 1,300 acres; there are seven chief with lesser ones, lying in every quarter. The oldest is Bushnell Park (from the great preacher Horace Bushnell who secured its creation), in the heart of the city, 48½ acres; continued south on a sharp rise by the grounds of the State Capitol, where were formerly the buildings of Trinity College. The largest is Keney Park (formerly Ten-mile Woods), purchased, prepared and maintained from the bequest of Henry Keney, in the extreme north, extending into Windsor, containing 663.4 acres. It is managed by private trustees, and is the only one in which automobiles are limited. Next is Goodwin Park in the extreme south, some 200 acres, bought at a generously low figure from Francis Goodwin, Esq. Elizabeth Park in the extreme west, largely in West Hartford, of 100 acres, the bequest (with a maintenance fund) of Charles M. Pond in memory of his wife, is the most beautiful in flowers and trees, and is the nursery for the other parks. Pope Park southwest of the centre, in the chief manufacturing district, is mainly the gift of the late Col. Albert A. Pope of bicycle fame, and has 92 acres, 19 being city additions. Colt Park, 106 acres, was the bequest of Mrs. Samuel Colt, and extends down to the neighborhood of the great fire-arms works. Riverside Park, 80 acres, is a reclamation and beautifying of the formerly squalid river-front north from the stone bridge to the New York and New England Railroad bridge, and was laid out by the late Frederick Law Olmsted, a native of the city. The last two are most useful, being the only practicable resorts for the poor thousands near the river, and are the chief city playgrounds for active games. Rocky Ridge Park, 28 acres, is the long narrow strip of the old stone quarry (for street paving) next the bluff at and north of Trinity College, overlooking Zion street and Parkville. There are several smaller squares and spaces: one of a block, Sigourney Square in the west, is on the site of the old poor-farm pesthouse graveyard, shunned for building purposes, and has transformed the whole character of its neighboring residence section.

The city has a remarkable number of handsome and architecturally notable buildings. Foremost is the State Capitol, of white marble, towering over Bushnell Park; the handsomest in the country except the one at Albany, and architecturally surpassing that in many ways. It was completed in January 1880, at a cost of $2,534,024.46; land and other expenses made the total $3,342,550.73. The general plan was of 13th century Gothic, but modern needs forced very many changes in this. Each side is an individual and separately beautiful design; and the interior is as notable as the exterior. Its extreme length is 295 feet 8 inches; depth of centre part, 189 feet 4 inches; depth of wings, 111 feet 8 inches; height from ground line to top of crowning figure, 256 feet 6 inches. It is fire-proof, the only fire-proof capitol in existence. It is still more curiously distinguished as being the only considerable public building in America built within the appropriation. The State Library and Supreme Court, formerly in the Capitol, have been moved since 1910 into a new and splendid building just south, costing $1,375,500; of granite, Italian Renaissance style, fire-proof throughout (the only one of its kind), 294 feet 8 inches frontage on Capitol avenue, and 137 feet 6 inches deep, the main entrance 90 feet back from the curb with a well-kept lawn. The State Arsenal and Armory, finished 1909, is the finest in the United States: of Mohegan granite, 325x275 and 166 feet high, occupying one and three-quarters acres, its drill-room holding 12,000 people. It is on virtually the west part of Bushnell Park across the Park River, near Broad street. East of the Capitol, on Trinity street, is the handsome white granite building of the Orient Fire Insurance Company. Trinity College has fine buildings on high ground in the south part, designed to form a quadrangle.

The south central section of Main street on the east side is rapidly developing into one of the handsomest and most artistic street ranges in the country. To the old nucleus of the Ætna Life Insurance Company's white granite structure (formerly the Charter Oak Life's, but now elevated by four more stories), and across an alley next south the Wadsworth Atheneum's dark-brown, castellated and towered building designed by Ithiel Town, have been added on the north of the former, first the nobly beautiful white granite home of the Ætna (Fire) Insurance Company; then the immense gray skyscraper of the Travelers Insurance Company, 21 stories high including a large tower, the largest business structure in the city; on the south of the Atheneum, the small but elegant memorial of Mrs. Samuel Colt, of Quincy granite and thus lighter colored than its neighbor, joined to the latter without break and continued so by the white marble Morgan Memorial, extending through to Prospect street, erected by J. Pierpont Morgan (of Hartford birth) for a memorial to his father Junius Spencer Morgan, the eminent banker. A 65-foot way was reserved south of the Morgan Memorial grounds, and next have since come the new municipal buildings, handsome classic structures of white granite. Going north, the city hall (old State House), completed May 1796, is of double interest, architecturally and historically; it was designed by Charles Bulfinch, the architect of the United States Capitol, and the famous Hartford Convention of 1814 (q.v.) was held here. The post-office in its rear, of white granite, is a Mullins creation of the Grant era. Opposite this on State street is the tall handsome building of the First National Bank. The red sandstone Cheney Building well north on Main Street, put up as a monument by the great silk firm, was designed by Henry H. Richardson (q.v.), the most original and influential of American architects. On the corner of Main and Pearl is the deep office building of the Connecticut Mutual Life Insurance Company, and down Pearl a short distance are the Phœnix Mutual Life and the National Fire on the south, and the Security Company and the Connecticut General on the north, with the Hartford Fire just beyond at Pearl and Trumbull. The Hartford Life is at Asylum and Ann. The Rossia has a very handsome new structure at Farmington and Broad, next to the high school and theological seminary. Of the individual bank buildings, the most impressive are the Hartford-Ætna's 11-story, on the north corner of Main and Asylum; the First National as above; the Phœnix, Main just south of Asylum; and the Society for Savings on Pratt street. There are many other attractive business and public structures. The three leading hotels are the Allyn (Asylum and Trumbull), the Heublein (facing Bushnell Park at Mulberry and Wells) and the Bond (Asylum near High). Of several handsome church buildings, Saint Joseph's Cathedral (Roman Catholic), on Farmington avenue near Sigourney street, is most striking; it is 26x178 feet and 93 feet high, with two heavy towers intended to be crowned with spires. Of the others, Christ Church (Protestant Episcopal) at Church and Main, with its superbly equipped new parish house; Saint Patrick's (Roman Catholic) at Church and Ann, the church of the Good Shepherd or Colt Memorial (Protestant Episcopal) on Wyllys, Trinity (Protestant Episcopal) on Sigourney, Immanuel (Congregational, formerly the Pearl Street) at Farmington and Gillette, and the Church of the Redeemer (Universalist) on Asylum avenue east of the School for the Deaf, call for special notice architecturally. The Center Church (Congregational), Main south of Pearl, is of the highest interest historically, as housing the oldest church society in the city, reaching back to its beginning.

Of the city monuments, the three most prominent for artistic effect are the Soldiers' Memorial Arch, forming a gateway into Bushnell Park across the Park River south of Pearl



The State Capitol and Soldiers and Sailors' Memorial Bridge and Arch, in Bushnell Park

and Ford; the endlessly satisfying Corning fountain in that park, a gift from John J. Corning of New York — a bronze with symbolical Indian figures, the work of J. M. Rhind; and the modified exedra in Colt Park, crowned by the statue of Colonel Colt. It has also statues of Israel Putnam, by J. Q. A. Ward — an eight-foot bronze with granite pedestal, given by J. P. Allyn in 1874; and Horace Wells of Hartford (the discoverer of anæsthesia) by Truman H. Bartlett, erected by State and city in 1875. The city has also two statues of Nathan Hale: one in the Capitol, by Karl Gerhardt, the other in front of the Wadsworth Atheneum, by E. S. Woods. One of the bridges across the river into Bushnell Park, that from Mulberry street, is the gift of George E. Hoadley, Esq., in memory of his grandfather, Jeremiah Hoadley; it is of red granite and excellent workmanship. On North Main street is a clock tower with chimes, erected from the bequest of Henry Keney, the giver of the great park.

The educational institutions are of high grade and distinction. At their head stands Trinity College (q.v.); Episcopal in origin and headship, but wholly non-sectarian in teaching and with a singularly able corps of instructors. The Hartford High School, on Hopkins and Asylum just west of the railroad station, with some 2,500 pupils, stands in the foremost rank and is the most completely equipped in the country. Its main building is 426 feet long with an average of 50 feet wide, and cost in buildings, land and equipment $598,500; but in 1911–15 land was bought through to Broad street and buildings erected for a supplementary technical high school, which cost $689,529.88, has a gymnasium and assembly hall and seats 1,500 pupils. Pupils from surrounding towns are admitted on payment. The city schools are on the district system, despite many attempts at the polls to consolidate them; but the taxes for their support are equalized by reapportionment. There are nine districts, with 20 buildings altogether. The school outlays are about $750,000 a year. There are also three commercial colleges or schools, and a commercial high school at Saint Joseph's Convent; four parochial Roman Catholic schools, with some 2,500 pupils, besides a convent school for Polish children. Hartford has also a theological seminary, the Hartford Theological Seminary on Broad street, managed by the Pastoral Union (Congregational) of Connecticut, with an affiliated School of Religious Pedagogy, once famous at East Windsor; a Roman Catholic seminary for training priests, Saint Thomas' on Collins near Woodland; and a missionary college and seminary of the Fathers of La Salette.

Religiously, Hartford is the seat of a Roman Catholic and a Protestant Episcopal bishop. There are about 70 church societies, of which the Congregational (11), for a century the only one, Roman Catholic (10), Baptist (9), Episcopal (10), Methodist (7), and Hebrew (7 synagogues), are the chief denominations. The Connecticut Missionary Society has its head office here. There are 10 convents: four of the Sisters of Mercy (mother house in the State, established 1853), two of the Sisters of Saint Joseph, two of the Sisters of the Holy Ghost, one of the Sisters of the Good Shepherd and one of the Felician Sisters of Saint Francis (Polish).

Its charitable and related institutions are renowned. It was the earliest seat of attempts to instruct the United States deaf and dumb, through Thomas Gallaudet and Laurent Clerc; and the School for the Deaf, formerly Deaf and Dumb Asylum, carries on the work in buildings on Asylum and Garden. The Retreat for the Insane (now renamed Hartford Retreat), on Washington street, has endowments which reduce its charges to patients. The Hartford Hospital on South Hudson, Saint Francis' Hospital at Collins and Woodland (R.C., but open to outside paying patients), the Hartford Orphan Asylum, the Watkinson Farm School, the Young Men's Christian Association, the City Mission and Open Hearth, the Hartford Social Settlement, the Old People's Home, Mrs. Colt's munificently endowed home for old ladies, and various other refuges for the aged and indigent, are only part of its overflowing charities. One of the most useful is the Woman's Christian Association establishment on Church street, affectionately known among its friends as "the Home," for girls' lodging and board, with two buildings, one lately finished; it is managed so as to earn its expenses but make no profit, and place is given to working girls at the lowest rate consistent with this. Saint Elizabeth's Home, R. C., Main opposite Park, does the same service for its class. The Connecticut Humane Society has also its head office in Hartford.

The library facilities of the city are extraordinary; and having been gathered by several different institutions for very diverse functions, are far more varied in contents and utility than if collected by any single one. There are 12 public or class libraries, all cordially helpful to the investigator, containing toward three-quarters of a million volumes, and fully four times as many pamphlets and manuscripts. Two of these, the Hartford Free Public and the Case Memorial, are circulating libraries; the others reference only. In the Wadsworth Atheneum are housed the Hartford Free Public Library, with about 125,000 volumes; the Watkinson Library, with nearly 100,000 and some thousands of pamphlets (the only collections of art books of any extent are in these two); and the Connecticut Historical Society, with some 40,000 volumes and as many pamphlets and about 50,000 manuscripts, its great field being New England and adjacent genealogy and local history. The library of Trinity College, towards 90,000, is strong in the demand by nearly a century of professors for the latest textbooks for their classes in many fields. The Case Memorial Library (endowed by the late Newton Case), in the Theological Seminary, has about 108,000 volumes and above 60,000 pamphlets; and is rich not only in its necessary specialty (including Oriental and other "missionary" languages for its training work), but in English literature, sociology, mediæval history, church music and other related subjects. The School of Religious Pedagogy has also a considerable library of its own. The State Library has not only an immense collection (close on 200,000 volumes and toward 1,000,000 pamphlets) of public documents, legal reports and digests, State and other laws, Hansard's parliamentary debates (the one set in the city), and a good general reference library, but above 1,000,000 manuscripts, and is the authorized State depositary of all local records in the State not needed for current use in their localities. It and Trinity are also official depositaries of all United States government publications. The Hartford County Bar Association's library in the County Court House (Trumbull and Allyn), the lawyers' working library, has above 10,000 volumes. The Hartford County Medical Association, in the Hunt Memorial building on Prospect street (across the street from the Atheneum Annex, which contains the children's department of the Public Library), is building up a strong medical library from a large recent endowment. Two church libraries also have notable gatherings of great service to both clergy and outside users: that in Saint Joseph's Cathedral of Catholic works especially, and the (Sunday School) Teachers' Library in the Center Church parish house, on Gold street, a large and well-chosen collection of high grade, very different from its old congeners. The High School has a good library.

The Wadsworth Atheneum is a peculiar institution. It is a board of trustees holding the buildings and grounds so named, and including the control and management of the Colt and the Morgan Memorial buildings, already mentioned; in addition, it houses in its buildings the three libraries just specified; and it is also a collector and exhibitor of art objects and museum contents of all kinds. These collections it now places wholly in the Morgan Memorial, which contains not only the late J. P. Morgan's matchless set of tapestries, the finest in America, his splendid collection of Dresden and Meissen porcelains, old faïence and other art works, the magnificent illustrated catalogues of his art treasures, his sets of Gould's Birds and Curtis' North American Indians, and other rare and valuable articles, but all the Atheneum's gallery of pictures, gifts and loans of the same, beautiful collections of pottery, silverware, bric-à-brac of all sorts, coins, etc., and also of minerals, birds and eggs, and other matters of natural history. It has also lately come into possession of the late J. Coolidge Hill's fine collection of medals and badges, with his library of literature on them deposited in the Watkinson Library. Mrs. Colt's memorial has collections of firearms illustrating the development of the Colt revolver, and of art objects. Both these are connected with the old Atheneum building by passages on two floors, forming one unbroken interior as exterior. The Connecticut Historical Society has also an interesting and valuable collection of colonial and Indian relics.

Hartford, as the head of navigation and therefore distributing point for the Connecticut Valley, early gained an importance as a centre of wholesale trade which it has never lost; to accommodate this, the Hartford Bank, then the fifth and now (as Hartford-Ætna) the fourth oldest in the country, was organized in 1792. But its largest importance is now as one of the leading insurance centres in the world, and second in the United States. This business seemingly originated in marine insurance on its West India cargoes, and later added fire insurance, which speedily far overshadowed its mate. After tentative efforts in the 1790's, it became permanently established in 1803 as marine, and in 1810 as fire, in the Hartford Fire Insurance Company, followed in 1819 by the Ætna. Life insurance was begun in 1846 by the Connecticut Mutual; accident in 1864 by the Travelers; steam boiler in 1866 by the Hartford Steam Boiler; employers' liability in the early 90's by the Travelers; and live-stock in 1866 and 1867 by companies which abandoned it forever in 1868. The loans of these insurance companies, especially the life with their vast reserves, not restricted in investment by law as are those of New York, have been one of the greatest agencies in developing the West, amounting to billions of dollars. There are now six independent fire companies, the Hartford (largest in the United States), Ætna, Phœnix (also owning the Connecticut Fire but letting it operate separately), National, Standard and Hartford County Mutual, besides the United States branches of several foreign companies; six life companies, the Connecticut Mutual, Ætna Life, Phœnix Mutual, Travelers (life branch), Connecticut General and Hartford; three accident companies, the Travelers, Ætna (department of Ætna Life), and Hartford (branch of Hartford Fire); two general indemnity companies, branches of the Travelers and Hartford Fire; and the original and largest steam-boiler insurance company of the United States, the Hartford. There are 11 banks of discount, four of them national banks; five trust companies; one State bank, and five savings banks — one (the Society for Savings or "Pratt Street Bank") the oldest in Connecticut, chartered 1819, and by far the largest.

The manufacturing interests are extremely heavy and varied, leading the world in several important lines: there are about 150 incorporated manufacturing companies in the city. The famous Colt works make all kinds of firearms, including machine guns, and also a great range of machinery for making special machines and tools, a line of work which engages other powerful Hartford companies; two of the foremost typewriters, the Underwood and Royal, have their works here, and in amount and value of product it heads the world, as it does in horseshoe nails and leather belting; it has the largest drop-forging plant in America, if not in the world; it is very prominent in electric machinery, screws, machine tools and chucks, cyclometers, steam-boilers and engines, knitting and book-sewing machines, blowers, steam turbines, coil pipes, plumbers' and railway supplies, and other heavy metal articles; and manufactures also church organs, rubber goods, pottery, furniture, carriages, harness, knit goods and many other things. It has also one of the largest printing houses in New England, The Case, Lockwood & Brainard Printing Company, which has manufactured many famous works; three daily papers, the *Courant* (morning, Rep.), the oldest newspaper in the country (founded 1764), *Times* (evening, Dem.) and *Post* (evening, Rep.); and many regular or casual business and other publications.

The mayor holds office for two years, and the city government is of the regular two-chambered form. The assessed valuation of property is about $145,000,000, making it per capita one of the richest cities in the United States — toward $1,200 per head. The tax rate is something over two cents on the dollar, varying with the district school tax.

The first white settlement of Hartford was by the Dutch in 1633, at the junction of the Park and Connecticut, still called Dutch Point (although the original point is out in the Connecticut). They built there a fort called the «House of Hope» (commemorated by Huyshope avenue). (For the settlement of the Newtown men in 1635–36, and the adoption of the first written constitution of modern times, whence Hartford is called the «birthplace of American democracy,» see Connecticut). Hartford was first named Newtown, changed to the present name in honor of its minister Samuel Stone's English birthplace. From here in 1637 sailed the expedition of 90 men under John Mason which heavily crippled and caused the ultimate destruction of the Pequots, the tribe of recent Indian invaders who had dispossessed the original Indian holders and terrorized the other Connecticut Indians, and who were making Connecticut untenable for civilized settlers. This campaign made possible Connecticut as it stands, and probably in any form. The Dutch were ejected from their fort in 1654; they had never really made a settlement. (For the attempt of Andros to seize the charter, in 1687, see Charter Oak). In 1701 Hartford became joint capital with New Haven. In the Revolution, Hartford, as the head of the one rich store of supplies which the British could not seize, became of prime importance; the second commissary-general of the United States army, Jeremiah Wadsworth, was a Hartford merchant. Governor Trumbull (Washington's «Brother Jonathan»), much of the time in Hartford, was also a strong reliance of Washington, who came to Connecticut to consult him; and in 1780 Washington and Rochambeau planned the Yorktown campaign here. The Hartford Convention (q.v.) of 1814 sat here. In 1873 Hartford became the sole capital of the State. From its original limits have been cut off the towns of West Hartford, East Hartford and Manchester (the latter directly from East Hartford).

Its native and adopted citizens have made the city one of the intellectual glories of New England. It was the birthplace of Noah Webster (West Hartford was cut from Hartford). Frederick Law Olmsted, John Fiske and Edmund Clarence Stedman, and others of less note but of high merit; it had the services of Joel Barlow, George D. Prentice, John G. Whittier and others — after the Revolution, so brilliant a group of Connecticut authors and professional men gathered here or made it their literary headquarters that they were known all over the country as the «Hartford Wits» (q.v.), and are still remembered by the name; it was the long or permanent residence of Harriet Beecher Stowe, Mark Twain, Charles Dudley Warner and Horace Bushnell, besides John Trumbull the poet, Lydia H. Sigourney, and the remarkable Stonington Trumbull family — James Hammond, the antiquarian, Indian scholar and librarian, Gurdon the nature painter, and Annie (Mrs. Slosson) the story-writer and entomologist. In the musical field, Dudley Buck, the distinguished composer, was born here; and Henry C. Work of Middletown, the second greatest of American song-wrights, lived much here and died here. In the business world, J. Pierpont Morgan was born here, his father, Junius S. Morgan (by parentage and associations really a Hartford man himself), began his great business career as a Hartford dry-goods merchant, and Edwin D. Morgan, the war governor of New York, began his as a Hartford wholesale grocer and provision merchant.

Forrest Morgan,
Assistant Librarian, Watkinson Library.

HARTFORD, Mich., village of Hartford Township, Van Buren County, 15 miles west of Paw Paw on the Paw Paw River, and 17 miles northeast of Benton Harbor, on the Chicago and M. L. S. Railroad. It has a graded school and five churches. It carries on a considerable traffic in agricultural produce and stock, has grain elevators, flour, saw- and planing-mills, canneries, electric-light plant, etc. Pop. 1,268.

HARTFORD, Vt., town of Windsor County, on the White River, about one mile above its junction with the Connecticut River, and 60 miles south of Montpelier, on the Central Vermont and Woodstock railroads. It has many mills and manufactories and three public libraries. Pop. 4,179.

HARTFORD CITY, Ind., city, county-seat of Blackford County, on the Pittsburgh, C., C. and Saint L. and the Lake E. and Western railroads, about 45 miles southwest of Fort Wayne, and 60 miles northeast of Indianapolis. The natural resources which contribute to the industrial and commercial interests are the products from the surrounding agricultural country, the natural gas supply and the oil fields. The city owns and operates the waterworks. Pop. 6,187.

HARTFORD CONVENTION, of 1814; a gathering of New England Federalists to discuss measures for securing New England interests against the South and West, especially in relation to the War of 1812. The convention opposed the war on several grounds — the vital objection being that it was destroying all American commerce in order to punish Great Britain for crippling a part of it. It was believed by the delegates that the agricultural States were sacrificing New England, whose life-blood was commerce, from ignorance mingled with sectional malice (see Embargo). All through the war, the New England Federalists, impoverished and excluded from the national councils, harassed and hampered the government in conducting it; the government retorted by leaving the whole section to its fate; the British inflamed the discord by exempting the New England coast from blockade, and the government countered by laying a new embargo which did the same work. All the New England States and New York were swept by the Federalists on this issue. In November 1813 the governor of Vermont recalled a brigade of militia from garrison duty; the government threatened prosecution, the Massachusetts legislature threatened to use the State power to support him. In the autumn of 1814 the destruction of New England industries had become intolerable; the coast was undefended, the British were occupying that of eastern Maine, and Congress was proposing a conscription so severe as to enlist minors without the consent of their parents; whereupon the Connecticut legislature ordered the governor to call a special session to protect its citizens if the measure were adopted. On 18 October the Massachusetts legislature proposed a convention of the New England States, to take action «not repugnant to their obligations as members of the Union,» and «lay the foundation of a radical reform in the national compact» through a future national convention. Connecticut and Rhode Island accepted the proposal with similar qualification; New Hampshire was divided politically, and Vermont was excited over Macdonough's victory at Plattsburg, but certain counties sent delegates. The war was a growing and alarming failure. England was demanding the renunciation of the whole Northwest as the price of peace; national bonds were at 25 per cent discount. The government sent a regular army officer to oversee the convention and use force if it attempted disunion; deputed secret agents to see if it was true that there was a plot to make New England an English grand duchy under a prince of the blood; and appointed the succeeding 12th of January a national fastday. The convention met at Hartford, Conn., 15 Dec. 1814, with 12 delegates from Massachusetts, 7 from Connecticut, 4 from Rhode Island, 2 from New Hampshire and 1 from Vermont,— 26 in all. George Cabot of Massachusetts was chosen president, and Theodore Dwight of Connecticut secretary. A secret session of three weeks was held and a report to the New England legislatures prepared. On 5 Jan. 1815 the convention adjourned. The report stated the before-mentioned grievances, and charged the government with making naturalizations too easy and with destroying the balance of sections by forming new States at will out of the Western territory; but denied any present intention to dissolve the Union. It was proposed that Congress should confide the defense of each State to the State itself, and return a share of its taxes for the purpose; and recommended seven changes in the Constitution, namely, abolition of the three-fifths slave representation, the requirement of a two-thirds vote for the admission of new States, the limitation of embargoes to 60 days, the requirement of a two-thirds vote to sanction the prohibition of commercial intercourse, or to declare war or hostilities, except in case of invasion; the exclusion of naturalized foreigners from civil offices or a seat in Congress, and prohibition of a President's re-election. They proposed also that two Presidents in succession should never be elected from the same State. They also recommended that another convention should be held at Boston the following June if affairs did not mend or the amendments were rejected. The Massachusetts and Connecticut legislatures adopted the report and sent commissioners to Washington; but before they arrived a satisfactory peace was made, all disasters forgotten in the blaze of the battle of New Orleans, and the promoters of the convention detested as traitors preparing to secede. They were in fact killed for public life. But in 1819 Cabot deposited the journal of the convention with the Massachusetts secretary of state as a permanent testimony that nothing treasonable was attempted; in 1833 Dwight wrote its history. Consult Cabot's 'Life and Letters,' ed. by Lodge (1877).

HARTFORD FERN. See *Filicales* (2), under Ferns and Fern Allies.

HARTFORD THEOLOGICAL SEMINARY, an institution founded in 1834 for the education of Congregational preachers, at East Windsor Hill, Conn. It was formerly called the Theological Institute of Connecticut, and took its present name on its removal to Hartford in 1865. Its control is vested in a board of trustees elected by the Pastoral Union, an association of 200 ministers who have subscribed to the creed of the Union. The aim of the institution is to train ministers for pastoral work on the broadest lines of intellectual and spiritual life. The Hartford School of Religious Pedagogy was affiliated with the seminary in 1902. The Kennedy School of Missions is another affiliated work. The Case Memorial Library has also been added to the institution. A bi-monthly *Bulletin* is issued by the seminary.

HARTFORD WITS, the name admiringly given by the cultivated circles of the United States to a group of Connecticut professional men and literary aspirants, who lived in Hartford or met there for converse and collaboration, from shortly after the Revolution till toward 1800. The exact composition of the group is not uniformly agreed upon; but the unquestioned members were Richard Alsop (perhaps its leading spirit and the most prolific contributor to its joint efforts), Joel Barlow, Theodore Dwight, Lemuel Hopkins and David Humphreys. Benjamin Trumbull, the historian, is sometimes added. Most of them were Yale men; all were strong Federalists, like nearly all cultivated New Englanders of the time; and their writings had little of pure literature compared with envenomed politics. The very name of their «Anarchiad,» modeled on the English «Rolliad,» and like it a joint political satire in heroic verse, expresses its purpose. Another collaboration was the «Echo,» a set of satires, burlesques and parodies mostly in the same form, written 1791–95, and published in a volume in 1807. «The Political Greenhouse» was another.

HARTINGTON, Spencer Compton Cavendish, Marquis of. See Devonshire, Spencer Compton, Duke of.

HARTINGTON, Neb., city, county-seat of Cedar County, on Bow Creek, and on the Chicago, St. P. and O. Railroad, about 42 miles west by north of Sioux City, Iowa, and 18 miles south by east of Yankton, S. D. It is in a fertile agricultural region and is the commercial centre of Cedar County. Pop. 1,413.

HARTLEBEN, Otto Erich, German dramatist and short-story writer: b. at Clausthal in the Harz Mountains, 3 June 1864; d. at Salo on Lago di Garda, 11 Feb. 1905. He received a regular middle-class education, proceeding, after the completion of his gymnasium course, to the universities of Leipzig and Berlin for the study of law (1886–89), became a «Referendar» at the «Kammergericht» at Berlin in 1889 and was assigned to various small judicial positions at Stolberg and Magdeburg, giving up this calling in 1891 to become a free-lance in literature, with his home at Berlin. His life was so full of exertions of every sort that he had a nervous breakdown in 1900 and had to go to a sanatorium, after being discharged from which he settled on Lago di Garda, where he died of heart-failure induced by a previous hæmorrhage. In the movement known in Germany as «Die Moderne,» Hartleben was the most ingratiating and pleasing stylist, presenting, in his short stories, accounts that are full of wit, humor and satire; the best of these are 'Die Geschichte vom abgerissnenen Knopf' (1893, dramatized as 'Die Lore'), and 'Der gastfreie Pastor' (1895). Two of his dramas have held the stage for years: the comedy 'Die sittliche Forderung' (1898) and the tragedy (with excellent *milieu* treatment) 'Rosenmontag' (1900; 17th ed., 1907). His plays lack energy and grandeur but have much irony, good humor and mood-painting, which is also the case with his lyric poems. (Consult Pollard, Percival, 'Masks and Minstrels,' Boston 1911). His other works are 'Studententagebuch' (poems 1885–86); 'Hanna Jagert' (comedy 1893); 'Ein Ehrenwort' (drama 1894); 'Meine Verse' (poems 1895); 'Ein wahrhaft guter Mensch' (comedy 1899); 'Ausgewählte Werke' (in 3 vols.. ed. with Introd. by F. F. Heitmüller, Berlin 1909).

JACOB WITTMER HARTMANN.

HARTLEPOOLS, England, a port and parliamentary borough of Durham County, comprising the towns of Hartlepool (or East Hartlepool), pop. 22,700, and West Hartlepool, pop. 62,600. Situated on the North Sea and separated by Hartlepool Bay, 18 miles southeast of Durham, they have stations on the North Eastern Railway, 247 miles northwest of London. The harbor was important as early as the 12th century, and the towns officially regarded as one port have an extensive coal trade, iron-shipbuilding, marine engineering, cement manufacture and sea fisheries. The ships entering and leaving the harbor annually have an average aggregate tonnage of 1,226,000, and the export trade in coal amounts to over 946,500 tons, valued at $5,482,000. East Hartlepool is the ancient town, West Hartlepool the modern. During the European War a German squadron bombarded the port in 1914. Total pop. 85,300.

HARTLEY, Jonathan Scott, American sculptor: b. Albany, N. Y., 23 Sept. 1845; d. 1912. After spending several years in studying art in England, Rome and Paris, he established himself in New York where he was professor of anatomy in the schools of the Art Students' League, 1878–84, and president of the league, 1879–80. Among important works by him are 'King René's Daughter'; 'The Whirlwind'; the Miles Morgan statue at Springfield, Mass.; Daguerre monument, Washington, D. C.; Ericsson monument, New York; statue of Alfred The Great, for Appellate Court building, New York (1900); statue of Thomas K. Beecher, Elmira, N. Y. (1901); 'Fisherman's Luck' and 'Cradle of Pan,' completed just before his death.

HARTMANN, härt'mân, **Karl Robert Edouard von:** b. Berlin, 23 Feb. 1842; d. 6 June 1906. He was educated for the army, but an injury to his knee compelled him to leave the service in 1865. He then began the study of philosophy, and for many years lived the retired life of a student. His most important publications are 'The Philosophy of the Unconscious' (1869); 'The Phenomenology of the Moral Consciousness' (1879); 'The Religious Consciousness of Mankind in the Stages of Its Development' (1881); and 'The Religion of the Spirit' (1882). Among his other works are 'Critical Grounds of Transcendental Realism'; 'The Crisis of Christianity in Modern Theology' (1880); 'Judaism in the Present and the Future' (1885); 'Lotze's Philosophy' (1888); 'The Ghost Theory in Spiritism' (1891); 'The Fundamental Social Questions' (1894); and many other works on society, religion, etc.

Von Hartmann's philosophy is called by its author a transcendental realism, because in it he professes to reach by means of induction from the broadest possible basis of experience a knowledge of that which lies beyond experience. A certain portion of consciousness, namely, sense-perception, begins, changes and ends without our consent and often in direct opposition to our desires. Sense-perception, then, cannot be adequately explained from the ego alone, and the existence of things outside experience must be posited. Moreover, since they act upon consciousness and do so in different ways at different times, they must have those qualities assigned to them which would make such action possible. Casuality is thus made the link that connects the subjective world of ideas with the objective world of things. An examination of the rest of experience, especially such phenomena as instinct, voluntary motion, sexual love, artistic production and the like, makes it evident that will and idea, unconscious but teleological, are everywhere operative, and that the underlying force is one and not many. This thing-in-itself may be called the Unconscious. It has two equally original attributes, namely, will and idea. Hegel and Schopenhauer (qq.v.) were both wrong in making one of these subordinate to the other; on the contrary, neither can act alone, and neither is the result of the other. The will is illogical and causes the existence, the *Das* of the world; the idea, though not conscious, is logical, and determines the essence, the *Was*. The endless and vain striving of the will necessitates the great preponderance of suffering in the universe, which could not well be more wretched than it is. Nevertheless, it must be characterized as the best possible world, for both nature and history are constantly developing in the manner best adapted to the world-end; and by means of increasing consciousness the idea, instead of prolonging suffering to eternity, provides a refuge from the evils of existence in non-existence.

The original state of the Unconscious is one of potentiality, in which by pure chance the will begins to strive. In the transition state, called that of the empty will, there is no definite end; and to avoid the unhappiness of aimless desire the will realizes the ideas already potentially present and the Unconscious becomes actual. The existence of the universe is the result, then, of the illogical will, but its characteristics and laws are all due to the idea and are, therefore, logical. The history of the world is that given by natural science, and particular emphasis is laid upon the Darwinian theory of evolution (q.v.). Man is developed from the animal, and with the appearance of the first human being the deliverance of the world is in sight, for only in man does consciousness reach such height and complexity as to act independently of the will. As consciousness develops, there is a constantly growing recognition of the fact that deliverance must lie in a return to the original state of non-willing, which means the non-existence of all individuals and the potentiality of the Unconscious.

The one foundation for ethics is pessimism, for no other view of life recognizes that evil necessarily belongs to existence and can cease only with existence itself. The essential feature of the morality built upon this basis is the realization that all is one and that, while every attempt to gain happiness is illusory, yet before deliverance is possible, all forms of the illusion must appear and be tried to the utmost. Even he who recognizes the vanity of life best serves the highest aims by giving himself up to the illusion, and living as eagerly as if he thought life good. It is only through the constant attempt to gain happiness that men can learn the desirability of nothingness; and when this knowledge has become universal, or at least general, deliverance will come and the world will cease. No better proof of the rational nature of the universe is needed than that afforded by the different ways in which men have hoped to find happiness and so have been led unconsciously to work for the final goal. The first of these is the hope of good in the present, the confidence in the pleasures of this world, such as was felt by the Greeks. This is followed by the Christian transference of happiness to another and better life, to which in turn succeeds the illusion that looks for happiness in progress, and dreams of a future made worth while by the achievements of science. All alike are empty promises, and known as such in the final stage, which sees all human desires as equally vain and the only good in the peace of Nirvana.

The relation between philosophy and religion lies in their common recognition of an underlying unity, which transcends all the apparent differences and divisions due to individual phenomena. Many changes must take place in the existing religions before they will be suited to modern conditions, and the resulting religion of the future will be a concrete monism.

The Philosophy of the Unconscious has been the subject of many different estimates, but is regarded as having less intrinsic than historical value. Its influence upon other thinkers was especially marked during the years following its first appearance, but at present that influence has much decreased.

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GRACE NEAL DOLSON,
Professor of Philosophy, Wells College.

HARTMANN, Moritz, Austrian poet and novelist: b. Duschnik, Bohemia, 15 Oct. 1821; d. Vienna, 13 May 1872. He was educated at Prague and Vienna and taught in Vienna till 1844, when he left the country on account of his political liberalism. Upon his return to Austria he was imprisoned but released by the Revolution of March 1848. He sat in the Frankfort Parliament of 1848 but fled from Vienna to escape imprisonment and took part in the "Rump Parliament" at Stuttgart. From 1849–68 he was in voluntary exile in foreign countries; was Paris correspondent of the *Kölnische Zeitung* and represented it in Crimea during the Russo-Turkish War; in 1860 lectured on German history and letters in the Academy at Geneva; and in 1865 became one of the editors of the *Neue Freie Presse.* He wrote 'Kelch und Schwert' (1845); 'Neure Gedichte' (1847); 'Reimchronik des Pfaffen Marizius' (1849); 'Der Krieg um den Wald' (1850); 'Schatten' (1851); 'Adam and Eve' (1851); 'Tagebuch aus der Provence und Languedoc' (1853); 'Briefe aus Irland'; 'Der Gefangene von Chillon' (1863); 'Die letzen Tage eines Königs' (1866); 'Nach der Natur' (1866); 'Die Diomanten der Baronin' (1868), etc. His select poems were edited in 1874 and his works in 1873–74 (10 vols.).

HARTRANFT, här'trănft, **Chester David,** American educator; b. Frederick Township, Montgomery County, Pa., 15 Oct. 1839. He was graduated at the University of Pennsylvania in 1861 and at the New Brunswick Theological Seminary in 1864; was pastor of the Dutch Reformed church at South Bushwick, N. Y., in 1864–66, and of that in New Brunswick, N. J., in 1866–78. In 1879 he was appointed professor of ecclesiastical history at the Hartford Theological Seminary; in 1888 was elected its president, and held the chair of Biblical theology 1892–97 and of ecclesiastical dogmatics from 1897 to 1903. He resigned the presidency in 1903 to engage in literary work in Germany. He was at one time president of the Conservatory of Music at New Brunswick, N. J.

HARTRANFT, John Frederick, American soldier: b. New Hanover, Pa., 16 Dec. 1830; d. Norristown, Pa., 17 Oct. 1889. He was graduated at Union College in 1853, and in 1859 was admitted to the bar. At the outbreak of the Civil War he organized the 51st Pennsylvania regiment, was made its colonel and with it participated in Burnside's expedition to North Carolina (1862). He also commanded the regiment in a charge at Antietam, and at Fredericksburg. In March 1865, he commanded a division of the Ninth corps in their assault on Fort Steadman, and was brevetted major-general. He was elected auditor-general of Pennsylvania in 1865, and re-elected in 1868. From 1872 to 1878 he was governor of Pennsylvania, and thoroughly reorganized the Pennsylvania militia, which from 1879 he commanded, with rank of major-general.

HART'S-HORN, the horn of the common stag and its decomposition products. The substances derived from the horns were the volatile liquor, salt and oil, and the ash which remains when the horns are calcined in the air. The fluid portions are got by destructive distillation in a convenient still, and are separated, the salt mechanically, and the others, after washing with water, by repeated rectification either alone or with quicklime, by which the more volatile portions are got free from the tarry matter and heavier oils. The salt which is formed in this operation is ammonic carbonate, which in part condenses the neck of the retort, in part is washed over by the aqueous vapor into the receiver; and when the ammonia is got pure from the distillate and is condensed in water it constitutes the spirit of hart's-horn. The volatile alkali or spirit of hart's-horn is now no longer obtained from that source, except in special circumstances; the ammonia of commerce is now obtained from gas-liquor, from blast-furnaces or from other sources.

HARTSUFF, George Lucas, American soldier: b. Tyre, Seneca County, N. Y., 28 May 1830; d. New York, 16 May 1874. He was graduated from West Point in 1852, entered the artillery, was on duty on the frontier and in Florida in the Civil War, became assistant adjutant-general, with rank of captain, in 1861, and major in 1862. Later appointed major-general of volunteers, he was one of the board for revision of the rules and articles of war and the preparation of a code for the government of the armies in the field. He was mustered out of the volunteer service in 1865, and in 1871 was retired from the regular army with rank of lieutenant-colonel and brevet major-general.

HARTSVILLE, Engagements at. Hartsville, Tenn., on the north bank of the Cumberland River, about 35 miles northeast of Nashville, is an important crossing and connected by good roads with Lebanon on the south and Gallatin on the northwest. In August 1862 Gen. John H. Morgan, with his Confederate command, was operating north of the river and Gen. R. W. Johnson, with a cavalry command, was sent to drive him back. Johnson, approaching on the Gallatin road, attacked Morgan 21 August, near Hartsville, and was defeated with a loss of 80 killed and wounded, and 75 prisoners. On 6 Dec. 1862 Hartsville was held by Col. A. B. Moore, with a Union force of three regiments of infantry, a regiment and a company of cavalry, and a section of artillery, in all about 2,100 men. Morgan had been instructed by General Bragg to operate on General Rosecrans' lines of communication in rear of Nashville and, learning that Moore was isolated, with no supports near, resolved to capture him. While two infantry brigades of Cheatham's division and Wheeler's cavalry demonstrated on Nashville, Morgan, with four regiments and a battalion of cavalry, two regiments of infantry and a battery, set out from Baird's Mills, 25 miles south of Hartsville, on the morning of 6 Dec. 1862, marched through Lebanon, crossed the Cumberland below Hartsville, during the night, disposed his forces so as to cut off Moore's retreat on the roads leading to Gallatin and Castalian, posts occupied by other Union commands, and early in the morning of 7 December, closed in on the Union camp, surprised it, attacked the troops, who were being hastily drawn up to receive him and, after a stubborn fight of an hour and a half, defeated and captured the entire command. Col. John M. Harlan, in command of a small Union brigade at Castalian Springs, nine miles away, hearing the noise of battle, marched to Hartsville and attacked Morgan's rear-guard as it was recrossing the river, recapturing some of the wagons taken. The Union loss was 58 killed, 204 wounded and 1,834 captured and missing. The Confederate loss was 21 killed, 104 wounded and 10 missing. Consult 'Official Records' (Vol. XX).

HARTT, Charles Frederick, American geologist: b. Fredericton, N. B., 23 Aug. 1840; d. Rio de Janeiro, Brazil, 18 March 1878. He was a pupil of Agassiz in the Museum of Comparative Anatomy at Harvard, and accompanied the great naturalist as geologist of a Brazilian expedition (1865). During this expedition he explored the coast from Bahia to Rio, made extensive zoological collections and by his researches made himself a leading authority on the natural history of South America. In 1875 he was appointed chief of the geological surveys of the empire of Brazil. He was also from 1876 director of the National Museum at Rio, where are deposited his collections, the most complete of South American geology in existence. He published 'Geology and Physical Geography of Brazil' (1870), and 'Contributions to the Geology and Physical Geography of the Lower Amazon' (1874). Consult Hay, 'The Scientific Work of Prof. Charles Frederick Hartt' (1899).

HARTWELL, Ga., town and county-seat of Hart County, the terminal of a branch of the Southern Railway, 100 miles northeast-east of Atlanta. Its educational institutions include a high school. There are cotton, flouring and sawmills, and a fruit cannery. Pop. 2,007.

HARTWELL, Ohio, village of Hamilton County, eight miles north of Cincinnati, on the Cincinnati, Hamilton and Dayton and on the Cleveland, Chicago and Cincinnati railroads. It has manufactures of wagons and carriages and a general retail and agricultural trade. Pop. 2,823.

HARTY, Jeremiah J., American Catholic prelate: b. Saint Louis 1853. He was graduated from the Saint Louis University in 1872, and took a theological course at Saint Vincent's College, Cape Girardeau, Mo. He was ordained priest in 1878, and appointed assistant pastor of Saint Bridget's parish in Saint Louis, holding this position until 1888, when he was commissioned to build the church and organize the parish of Saint Leo in the same city. His organizing work has been most successful. In 1903 he was appointed archbishop of Manila, the most important see in the Philippines.

HARTZELL, härts'ĕl, **Joseph Crane,** American Methodist Episcopal bishop: b. near Moline, Ill., 1 June 1842. He was graduated at Ohio Wesleyan University in 1865, and from Garrett Biblical Institute in 1868. He was ordained to the ministry in 1866, and held pastorates successively at Pekin, Ill., 1868–69, New Orleans 1870–73. In the latter year he founded and became editor of the *Southwestern Christian Advocate*. He was assistant secretary of the Southern Education Society 1882–88, and corresponding secretary 1888–96. In the latter year he was elected and consecrated bishop for Africa, in which capacity he served for 20 years, retiring by age limit 1 June 1916. He founded several important mission centres in Central, East and West Africa, chiefly among the black races, having, besides the support of the Methodist Episcopal Church, the co-operation of several governments and distinguished statesmen, including Earl Grey and Cecil Rhodes. He founded also missionary work in North Africa extending from Morocco to Tripoli among the Mohammedans with the co-operation of the French government. He is vice-president of the World's Sunday School Association and chairman of the committee on the work in Moslem lands, member of the Board of Foreign Missions and of the executive committee of the Freedmen's Aid Society having charge of large educational interests in the Southern States. He is a frequent contributor to the religious and secular press and the author of several important publications, including a report upon the moral condition of Moslem childhood. He is also well known as a preacher and lecturer. He was made Knight Commander of the Order for the Redemption of Africa by the republic of Liberia.

HARTZENBUSCH, härts'ĕn-boosh, **Juan Eugenio**, Spanish dramatist, critic and poet: b. Madrid, 6 Sept. 1806; d. there, 2 August 1880. His father was German and his mother Spanish. His father intended him for the Church and the boy spent his earlier years in a Jesuit college where he received a good classical education and conceived a love for Spanish literature. He early began writing poems and set himself to study dramatic literature. But his father losing his reason in 1823, young Hartzenbusch resorted to the trade of carpenter, which he had learned from his parent, to meet expenses. He continued his studies as best he could and made translations into Spanish from French and Italian dramatists. The death of his father in 1830 left him with his hands free. In 1831 he wrote two dramas based on classical models, neither of which received any attention from the public. So he determined to seek a more popular medium. This he found in sentiment, love and human interest keyed to the age in which he lived, and embodied in ‘Los amantes de Teruel,’ which was presented at the Teatro Principal in Madrid, in 1837. It was notably successful and placed the author among the popular dramatists of Spain. The appearance, the following year, of ‘Doña Mencia’ increased the reputation of the young author. The latter, inferior to ‘Los amantes de Teruel’ in almost every respect, owed its popularity to certain political principles presented in it and to the brilliancy of many parts. Its weakness consists in a lack of coherency in the plot and the indistinctiveness of the character delineation. ‘Alfonso el Casto’ (1841); ‘Juan de las vinas’ (1844); and ‘La Jura en Santa Gadea’ (1845) are all dramas that received the approbation of the public and increased still more the author's reputation and placing him among the foremost dramatists of his century. His national popularity had gained for him, in 1844, the position of chief clerk in the National Library, which suited his literary inclinations, since it gave him a certain amount of leisure and the opportunity to search for literary material, especially for the construction of his dramas. The success of ‘La Madre de Pelayo’ (1846), coupled with the fame brought the author by his previous dramas, led to his election to the Spanish Academy in 1847. In 1862 Hartzenbusch became head of the National Library, a post he held for 13 years, when he retired owing to ill health.

One of the most noted literary figures of the 19th century, Hartzenbusch was active in almost every field of literary endeavor. Beginning the translation of foreign plays into Spanish at the age of 15, he continued the work of translation or adaptation for years, thus enriching the field of the Spanish stage. Becoming dramatic critic in 1842, he did much for several years to improve the native drama and to free it from binding and harmful traditions of past dramatic endeavors. Had he given all his time to the writing of dramas he might have been one of the most productive dramatists of Spain. But he liked to vary his literary work; for he had much of the antiquarian in his composition. His editions or prefaces thereto of the works of famous Spanish writers, published in the Rivadeneira Library of Spanish authors, display a wealth of knowledge and a rare critical ability possessed by few Spanish literary critics. These cover 10 volumes and include the dramatic works of Tìrso de Molino, Calderón, Alarcón and Lope de Vega. Hartzenbusch's dramatic works include 34 translations of foreign dramas, 10 dramas recast and 25 original dramatic productions. Among the most notable of these are, in addition to those already mentioned, ‘Honoria’ (1843); ‘La Ley de Raza’ (1852); ‘Vida por houra’ (1852), all symbolical dramas; ‘Las hijas de Gracián Ramirez’ (1831); and ‘El infante de Don Fernando y el Antequera’ (1836), two unsuccessful historical dramas; ‘La visionaria’ (1840); and ‘La Coja y el Encojido’ (1843), two character dramas; ‘Derechos Póstumos’ (1856); and ‘La hija de Cervantes’ (1861), both curtain raisers. There are numerous editions of Hartzenbusch's works, one of the best being that of the *Coleccion de escritores casellanos* (Madrid 1877, et seq.). Consult Fernández-Guerra, ‘Austores dramaticas contemporáneos’ (Madrid); Pineyro, Enrique, ‘El Romanticismo en España.’

HARUN-AL-RASHID, hă-roon'ăl-răsh'ĭd, or **HAROUN-AL-RASHID**, caliph of Bagdad: b. Rhey, near Teherah, about 765 A.D.; d. Tus, 2 April 809. (See CALIPH). The popular fame of this caliph is by the ‘Arabian Nights' Entertainments’ (q.v.), in which Harun, his wife, Zobeide, his vizier, Giaffar, and his chief eunuch, Mesrur, are frequent and conspicuous characters. He was the fifth caliph of the dynasty of the Abbassides, and the most powerful monarch of his race. In 786 he succeeded his older brother, Hadi, who had vainly attempted to exclude him from the throne, and by his conquests and vigorous internal administration raised the caliphate of Bagdad to its greatest splendor, and made his reign esteemed the golden era of the Mohammedan nations. His favorite ministers were Yahia and his son Giaffar, or Jaafar, of the ancient Persian family of the Barmecides, whose ancestors had for many generations been hereditary priests at the fire temple of Balkh, and who now rapidly exalted the family to the highest dignities under the caliphate. In war he was successful against the Byzantines. His empire at its greatest extended from Tunis in North Africa to Transoxania. He was despotic and in his later years became suspicious of all around him. He executed his vizier and near relatives, which with other unreasonable acts caused general disorder and rebellion in his realm. He fell a victim to apoplexy while endeavoring to crush the rebels. Consult Palmer, ‹Haroun-al-Rashid.›

HARUSPICES. See ARUSPICES.

HARVARD, John, American clergyman, founder of Harvard University: b. England, probably in Middlesex, 1607; d. Charlestown, Mass., 24 Sept. 1638. He was entered as a pensioner at the University of Cambridge in 1628, was graduated B.A. in 1631–32, and M.A. in 1635, and having emigrated to America was made a freeman of the colony of Massachusetts, 2 Nov. 1637. The following year, as appears from the town records, a portion of land was set off for him in Charlestown, where he exercised the ministry. In April 1638, he was appointed one of a committee «to consider of some things tending toward a body of laws.» These are the only particulars known of his life. His property at his death was worth about £1,600, one-half of which he gave for the erection of the institution which bears his name; but part of this bequest, it is said, was diverted from its original purpose. He also left to the college a library of more than 300 volumes, indicating in their selection the taste and skill of a scholar. A monument to his memory was erected in the burial ground of Charlestown by the alumni of the university, and inaugurated with an address by Edward Everett, 26 Sept. 1828. See HARVARD UNIVERSITY.

HARVARD, Ill., a city and important railway junction in Chemung Township, McHenry County, at the intersection of three divisions of the Chicago and Northern Railroad, 63 miles northwest of Chicago. It has city waterworks, railroad repair shops, a malthouse and brewery, manufactures of agricultural implements, wagons and carriages and grist and woolen mills. Pop. 3,008.

HARVARD UNIVERSITY, the oldest institution of learning in the United States, was founded in Cambridge, Mass., in 1636. At a meeting of the General Court of the colony of Massachusetts Bay, convened on 8 September, six years after its first settlement, it was voted to give £400 toward a «schoale or colledge,» for the purpose of educating the «English and Indian youth in knowledge and Godliness.» The ensuing year 12 of the eminent men of the colony, including John Winthrop and John Cotton, were authorized «to take order for a college at New Towne.» The name Cambridge was adopted soon afterward in recognition of the English university where many of the colonists had been educated. In 1638 John Harvard, a young Non-Conformist minister, died in Charlestown, leaving to the college £750 and his entire library of 300 volumes. The institution was opened soon after and was named Harvard in honor of its first benefactor.

In 1637 the first building was erected. The first president was Rev. Henry Dunster, who was elected in 1640. The first graduating class was in 1642, and consisted of nine members. This same year a change was made in the government of the college; a board of trustees was created, the members of which were the governor, the deputy governor, the teaching elders of the «5 next adjoining towns»— Boston, Cambridge, Charlestown, Dorchester and Roxbury — the magistrates and the president of the college. The college was established as a corporation in 1650, with power of control over the educational and financial concerns of the institution. The members of the corporation were the president, the treasurer and five fellows. In 1657 the corporation charter was changed so that the overseers had practically no control over the internal management of the college, although a final appeal might be made to them if necessary. Now there were two governing bodies; the overseers and the corporation, at times working in harmony and again antagonistic to each other. In 1780 the board of overseers consisted of the governor, lieutenant-governor, senate and council of the Commonwealth, the president of the college and the ministers of the Congregationalist churches of the «six adjoining towns» already mentioned. In 1810 a further change was made in the board of overseers, and instead of the senate and the ministers of certain churches, there were substituted 15 Congregationalist ministers, 15 laymen, the president of the senate and the speaker of the house, all to be inhabitants of the State. The members constituting the senate were restored as overseers in 1814. A still further broadening of the spirit of the board was shown by the act of 1834, but not ratified until 1843, when clergymen of all denominations were made eligible for membership to the board, and in 1851 an act was passed in which no mention was made of clergymen, but the clause that made only inhabitants of the State eligible was retained. It was not until 1880 that Harvard was freed from all sectional lines, and non-residents of the State of Massachusetts became eligible for membership to the board of overseers.

During the 17th century Harvard had to contend with serious obstacles, many of which had their origin in religious differences or shades of differences; but the desire to give the youth of Massachusetts an opportunity to learn the things taught to their fathers in the schools of Europe never faltered. It required heroic courage then to persevere in such a work, which at present seems a comparatively easy task. The religious controversies continued even after donations and endowments had come to the aid of the institution and had made its success seem almost certain. Under the presidency of Rev. Increase Mather, the college was placed under the control of the Calvinists (1692), but in 1707 the liberals gained the ascendency. An English merchant, Thomas Hollis, in 1721, founded a chair of divinity, and directed that no religious test should be given to the candidate for the professorship. The gift was refused by the overseers, but the corporation urged its acceptance, and the latter finally prevailed. However, the first candidate for a professorship was really subjected to a religious test, for a confession of faith on various disputed points was exacted of him. The religious controversies were carried so far that at one time there was a strong effort made by the orthodox friends of learning to found another college in the colony; but Governor Bernard refused them a charter.

In 1764 the college met with a serious loss by fire; the first Harvard Hall, containing the library and apparatus, was entirely destroyed, but the loss was repaired to some extent by the generous aid of the Colonies. Harvard was loyal to the American cause during the Revolutionary period; even going so far in the readjustment of its financial affairs as to suffer considerable loss. The alumni and students have ever been patriotic, ready to contribute their best to the needs of their country. The fine building, Memorial Hall, was erected by the alumni in memory of their dead who fell in the Civil War. Harvard has always followed a conservative course when parties were agitating questions of government.

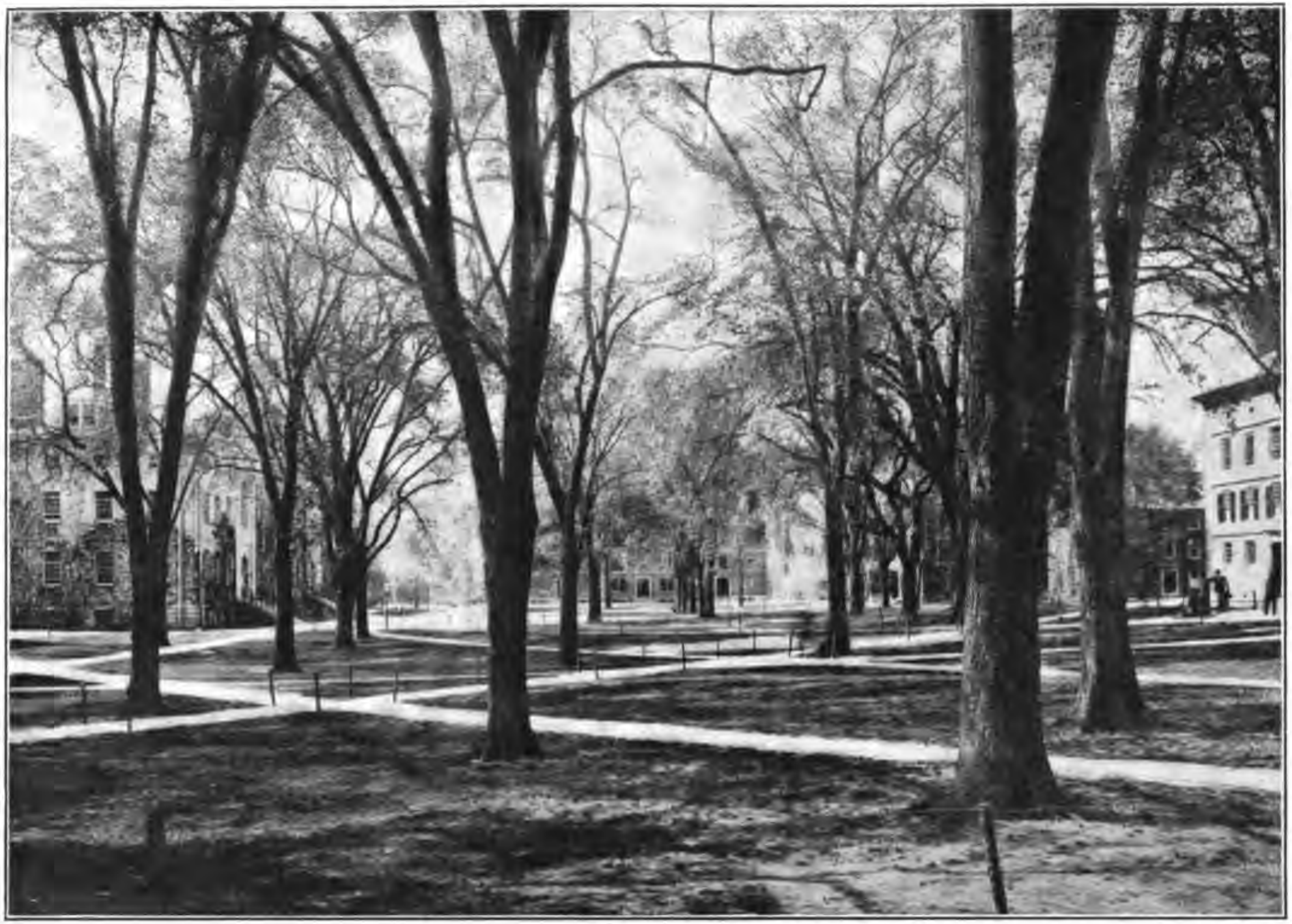
Between 1636 and 1782 Harvard College conferred only the degrees of bachelor and master of arts, but in 1780 the term university was applied to it in the constitution of the State of Massachusetts. The class of 1768 evidently gave some attention to dress, as they voted to wear homespun at their graduating exercises, although their action on the matter is often quoted to prove their democratic simplicity. In 1782 and 1783 three professorships of medicine were established, and the first degree of bachelor of medicine was conferred in 1788. In 1810 the lectures in medicine were transferred to Boston, and there the first medical college was built. The law school was established in 1817, and it has the distinction of being the earliest school of law in the country connected with a university and authorized to confer degrees in law. The divinity school was a gradual outgrowth of the college; the Hollis professorship of divinity, which has been mentioned, was established in 1721, but the divinity faculty was not formally organized until 1819. It is now undenominational, no assent to the special doctrines of any sect or denomination of Christianity being required of any instructor or student. The schools of medicine, law and divinity are the three oldest additions to the college proper, and it was decided that such an institution, having four schools and several departments, justified the title university.

In about 1822, a number of the friends of education and of the institution thought the time had come when further changes should be made in the work required of the students. George Ticknor (q.v.), professor in the department of modern languages, urged that some division of studies should be made whereby students might be permitted to pursue special courses or specialize on certain subjects. A committee, with Joseph Story as chairman, was appointed to investigate the wisdom of such a change, and how best to meet the needs of the students. The committee reported (1824) the advisability of instituting two lines of study — the one a course necessary for a degree, the other a scientific and mechanical course for those not intending to take degrees, but who desired to fit themselves for certain departments of work. The departure from old customs as recommended by the committee was opposed by many, but in 1825 changes were made and the special students were admitted. Professor Ticknor and later his successor, Henry W. Longfellow, introduced to some extent elective courses in the department of modern languages, but not until a number of years later did these courses become popular in other departments.

Charles William Eliot (q.v.) was elected president in 1869. At this time the departments were almost independent schools, to which no entrance examinations were required, but the students were largely from classical preparatory schools, the majority of which were located in New England. The college required certain courses, and all demanded good work and a high degree of scholarship before graduation. In four years practically a reorganization had been made, the departments had been correlated and individual work had been given recognition. In 1909, Dr. Eliot retired and was succeeded by Dr. Abbott Lawrence Lowell, formerly professor of the science of government at the university.

To Harvard much credit is due for the conservative manner in which it has dealt with the question of higher education of women. The Society for the Collegiate Instruction of Women was the name of an organization which began the work (1869) of providing ways and means for giving young women an opportunity to obtain a collegiate education. The name of the organization was changed, in 1894, by the General Court of Massachusetts to that of Radcliffe College (q.v.). Systematic collegiate instruction is now given in this college, under the professors and teachers of Harvard University. The requirements are the same as for admission to the university.

The various schools and departments of Harvard University now comprise: (1) Harvard College and the Graduate School, established in 1872 for students making original research. In 1916 there were in attendance 3,017 students under the faculty of arts and science. Of this number 598 were in the graduate school and were engaged in original research. For the students of this school who are engaged in original investigations there is available a number of fellowships, at present 41, which are from $400 to $1,200. The Edward Austin Fellowship and the Austin Teaching Fellowship are given only to resident graduate students. Some of the fellowships may be given to persons pursuing their studies in other parts of the country or abroad: but non-resident appointments are given only to persons who have been resident students in some department of the university. (2) The law school has been mentioned. The attendance in 1916 was 788. (3) The divinity school, already noticed, has an attendance of 64. (4) The medical school, founded in 1782, and the dental school, established in 1867, were united in 1899 and are in charge of the faculty of medicine. The school is located in Boston. The attendance in 1918 was, in the medical school, 387; in the dental school, 271. The new buildings erected since 1903 for the accommodation of the medical departments are second to none other in the world. There are seven separate buildings; the central structure and two of the side pavilions are provided for by the gift of $1,000,000 from J. Pierpont Morgan and $1,000,000 from other friends. The site comprises 26 acres, in Brookline, about three miles from the main buildings of the university in Cambridge. (5) The Graduate School of Business Administration, founded in 1908, had an enrolment of 190 in 1916. (6) The Bussey Institute, a school of agriculture and horticulture, was established in 1870 in accordance with the will of Benjamin Bussey,



THE YARD, HARVARD UNIVERSITY

Showing University, Gray's, Matthew's, Massachusetts, and Harvard Halls

It is at Jamaica Plain, in the southwestern part of Boston. (7) The Arnold Arboretum, established in 1872, is devoted to scientific research in forestry, dendrology and arboriculture. It was founded under the will of James Arnold. It is practically a large park containing about 220 acres, and is located in West Roxbury. (8) The astronomical observatory was established in 1843 by means of a public subscription. The Sears Tier was built in 1846 and two years later Edward Bromfield Phillips bequeathed to the university the sum of $100,000 for the observatory; this early bequest has since been supplemented by many others, so that the observatory now has an endowment of about $900,000. It has a director and four other professors and 40 assistants. A branch station is established on a mountain 8,000 feet high, near Arequipa, Peru. The annals of the observatory fill about 50 volumes. Among the more important instruments are the 15-inch and 6-inch equatorial telescopes, the 8-inch transit-circle, the 11-inch Draper photographic telescope, the 8-inch photographic telescope and the meridian photometer. A special grant has recently been made by the Carnegie Institution for the study of the collection of photographs at the Harvard Observatory. The amount of material, including photographs and photographic charts of the sky that has been collected in this department, requires a special building for its accommodation. (9) The university library, including the libraries of the schools and departments, contains about 1,181,635 volumes and 701,358 pamphlets. (10) The Gray Herbarium, so named because it contains the herbarium of Asa Gray (q.v.), presented to the university in 1864. (11) The university museum is made up of the following collections: the Peabody Museum of American Archæology and Ethnology; the Museum of Comparative Zoology, established in 1859 by private subscription, State aid and the collection of Louis Agassiz, and valuable gifts from his son; the Mineralogical Museum, established in 1890–91; the Semitic Museum, completed in 1902; the William Hayes Fogg Art Museum, completed in 1895; and the Germanic Museum, established in 1902. (12) The botanical garden, established in 1809, covers about seven acres and contains thousands of plants for scientific study.

Great credit is due Harvard for its leadership in the movement to better the teaching of the English language and literature in the schools of the country. Harvard mentioned the subject in its catalogue of 1865–66; an announcement was made in the catalogue of 1869–70 that «Students would be examined, as early as possible after their admission, in English.» In 1874, for the first time, every applicant for admission to Harvard was required to present English composition. The report of the committee who visited the preparatory schools to ascertain what they were doing with the subject of English, the discussions by educators on the «new demand of Harvard,» the progress of the movement, the grand results, all now are parts of the «History of Education» of America.

The university summer school gives short courses of study under the charge of a committee of the faculty of arts and sciences, and is held in the college buildings during the summer vacation. The school is popular and has had a large attendance each year. In 1910 the students numbered about 700. Athletics are provided for — two fields of 24 acres each and the Hemenway gymnasium furnish opportunities for physical training. The stadium erected on Soldiers' Field has a seating capacity of about 30,000. It is shaped like the letter «U,» with the open space toward the Charles River. It is of steel and concrete construction. The mezzanine floor under the seats, the promenade above the seats, the stairs, the perfect arrangement of all the parts make this stadium a model of construction. It was built under the auspices of the class of '79. A club house, called the Harvard Union, was donated by Henry Lee Higginson in 1901. The Phillips Brooks house is used for religious meetings. In 1903 Harvard received a valuable collection of plaster replicas of Germanic art; a number of them were given by Emperor William II of Germany. Among them is a replica of the equestrian statue of the Great Elector by Schülter, one of Frederick the Great, by Schadow, a cast of the golden gate of the cathedral of Freiburg, the bronze door of Hildesheim Cathedral, on which is the Biblical story of Creation, the wood screen of Naumburg Cathedral and several other reproductions of great value.

In 1915 the Widener Memorial Library was completed. This building was erected by Mrs. George D. Widener of Philadelphia in memory of her son, Harry Elkins Widener, a graduate of Harvard in the class of 1907, who lost his life with the sinking of the *Titanic*.

In 1918, the number of members of the corporation was 7; of overseers, 30; of professors and instructors, tutors and assistants, 831; of students in all the schools and departments, 5,731. In 1915 the invested funds of the university amounted to $28,177,578; the annual income was $3,032,999, and bequests and gifts amounted to $1,220,021. Harvard has had 23 presidents, including the present incumbent, Abbott Lawrence Lowell. There are 13 periodicals which represents the interests of the university as a whole, and of special schools and departments.

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HARVEST BUG or **MITE.** See MITES.

HARVEST-FISH. See BUTTERFISH.

HARVEST-FLY. A cicada (q.v.).

HARVEST-MOON, the full moon nearest to the autumnal equinox, when the earth's satellite, almost full, rises for several nights in succession close to the same hour. This phenomenon is less plainly seen in the United States than in higher latitudes, and is not met with in the tropics. It is due to the fact that at the time of the autumnal equinox the full moon, being exactly opposite the sun, is in that part of her orbit which makes a small angle with the horizon at the point of moon rise.

HARVEST MOUSE. See MOUSE.

HARVESTMAN, or **HARVEST SPIDER.** See DADDY-LONGLEGS.

HARVEY, George Brinton McClellan, American publisher and editor: b. Peacham, Vt., 16 Feb. 1864. After a secondary education, he became a reporter successively for the Springfield (Mass.) *Republican,* the Chicago *News* and the New York *World;* was for a time managing editor of the *World* and later a constructor and president of various electric railways. He was for a time president of the reorganized house of Harper & Brothers, but purchased and became editor of the *North American Review* in 1899. He published 'Women' (1908); 'The Power of Tolerance' (1911); is an LL.D of several colleges and resides at Deal, N. J.

HARVEY, Sir **John,** British army officer and administrator: b. 1778; d. 1852. During the War of 1812 he was deputy adjutant-general of the army in Canada, defeated the Americans at Stoney Creek and took part in the battle of Lundy's Lane and Chrystler's Farm. He was aide-de-camp to the Duke of Wellington in 1815 and was present at the battle of Waterloo. From 1837–41 he was lieutenant-governor of New Brunswick, and his firm and tactful handling of the so-called «Aroostook War,» in 1838–39, on the borders of Maine and New Brunswick, did much to avert an actual conflict. From 1841–46 he was governor of Newfoundland and lieutenant-governor of Nova Scotia, 1846–52.

HARVEY, Moses, Newfoundland historian: b. Armagh, Ireland, 25 March 1820; d. Saint John's, Newfoundland, 3 Sept. 1901. He was graduated at Queen's College, Belfast, in 1840; was pastor of the Free Presbyterian Church, Saint John's, Newfoundland, 1852–78, when he retired from the ministry and devoted himself to literary and scientific studies. Among his works are 'Newfoundland, the Oldest British Colony' (1883); 'Text-Book of Newfoundland History,' etc.

HARVEY, William, English physician: b. Folkestone, 1 April 1578; d. London, 3 June 1657; he was graduated at the University of Cambridge in 1593 and later at Padua. He is famous as the discoverer of the circulation of the blood.

HARVEY, William Hope, American author: b. Buffalo, Putnam County, W. Va., 16 Aug. 1851. He was educated at Marshall College (W. Va.) and practised law in 1871–84. He appeared as an author under the pseudonym «Coin» in 'Coin's Financial School' (1894), in advocacy of bimetallism as a currency standard. Other works by him are 'A Tale of Two Nations' (1894); 'Coin's Financial School Up to Date' (1895); 'Coin on Money, Trusts and Imperialism' (1899). In 1900 made his home in the Ozark Mountains in Arkansas, founding the village and settlement of Monte Ne. In 1915 he wrote the book entitled 'The Remedy,' which has become the prospectus of an educational organization with a national committee promoting its teachings, of which committee Mr. Harvey has been made chairman.

HARVEY, Ill., city in Cook County, on the Cleveland, Chicago, Cincinnati and Saint Louis, Big Four, Grand Trunk and the Illinois Central railroads, 19 miles south of Chicago. It was founded in 1891 and incorporated in 1892. Among first cities in State to adopt commission form of government. Its proximity to Chicago gives it the advantages of a residential city and its railroad facilities are an aid in the development of its manufactories. Some of the chief industrial establishments are railroad supply shops, an automobile factory, motor-truck factory, gas-stove factories, steel-car factory, foundry equipment factory, electric-machinery factory, automobile-engine factory, whiting factory, machine shops in which are manufactured ditching and mining machinery. The trade is principally in its manufactures and agricultural products. Pop. 9,220.

HARVEYED ARMOR PLATE. See Armor Plate; Steel.

HARWOOD, Andrew Allen, American naval officer: b. Settle, Pa., 1802; d. Marion, Mass., 28 Aug. 1884. He was a great-grandson of Benjamin Franklin (q.v.). In 1818 he entered the navy and served in the suppressing of the slave trade and piracy in the West Indies; in 1835–37 was with the Mediterranean squadron; in 1848 was given the command of the *Cumberland,* and in 1855 promoted to the rank of captain. In 1862 he was appointed chief of the Bureau of Ordnance and Hydrography; in 1863 he was made commandant of the Washington navy yard and Potomac flotilla, having the rank of commodore, and retired in 1869 with the rank of rear-admiral. He published 'Law and Practice of United States Navy Courts-Martial' (1867), and 'Summary Courts-Martial.'

HARZ (härts) **MOUNTAIN** (Ger. *Harzgebirge*), the northernmost mountain range of Germany, extending about 60 miles through Prussia, Brunswick and Anhalt, between the rivers Weser and Elbe, and occupying an area of about 786 square miles. The range, composed chiefly of Devonian and Lower Carboniferous formations, broken through with granite, is divided into the Upper and Lower Harz, with average elevations of 2,100 and 1,000 feet, respectively, the maximum altitude, 3,745 feet, being reached in the Brocken (q.v.). Woods and fine pastures abound; silver, iron, lead, copper and zinc are mined, and marble, alabaster and granite quarried. Traversed by fine roads and accessible by railroads, the range is a favorite touring ground, its interest enhanced by the traditions and weird legends which had their birth in this romantic region.

HASAN, hä'sän, and **HUSAIN,** hŭ'sēn, also written Hassan and Hosein, brothers, the eldest of the three sons of Fatimah, daughter of Mohammed, and Ali (q.v.), cousin and adopted son — as well as son-in-law — of the Prophet. Hasan and Husain were born in A.D. 625 and 626 respectively. After the death of his father (Ali) in 661, Hassan was proclaimed caliph by the Arabians. But he was a faint-hearted, poor-spirited creature, entirely different from his valiant father and masterful grandfather. Ali's powerful rival, Moawiya, now determined to assert his title to the whole Moslem empire. Already recognized as caliph in Syria and Egypt, he gathered an army and marched against Kufa to oust Hasan. The latter, however, nicknamed «The Divorcer,» was more intent on varying the composition of his ever-changing harem than on the business of public life and military enterprise. After a brief and inglorious reign of six months Hasan resigned the caliphate to Moawiya, and retired with his household and his brother to Medina. Here Hasan died by poison (A.D. 670) administered by one of his wives, who had been bribed with promises to commit this act by Yezid, son of Moawiya. Yezid succeeded his father (680) as the second caliph of the Ommiad dynasty (q.v.). Meanwhile, Husain had married a Persian princess and had attracted a large following among the Shiites (q.v.), in opposition to the Sunni sect. He refused to acknowledge Yezid as the lawful caliph, and, yielding to the desires of his adherents, he started on his journey from Medina to Kufa, the seat of Moslem government. He was accompanied by his family and relatives, including women and children, to the number of 80. Promises of support came from Kufa and other districts if he would appear in the city and claim his rights. Arrived on the plain of Kerbala on the confines of Irak, where Kufa is situated, the party of Husain, now strengthened by a number of Bedouins, was surrounded by an army of 80,000 horse. Seeing their cause hopeless, the Bedouins withdrew, and in the general slaughter that ensued Husain was killed, together with his two sons, six brothers (sons of Ali), two sons of Hasan and six descendants of Abu Talib (father of Ali). The women and children, and a load of 70 trunkless heads, were carried into the city. A thrill of horror and grief ran through the Moslem empire. Yezid disclaimed responsibility and received the sister of Husain and her two little sons with every mark of honor. The tragic scene was repeated in every household and served to strengthen the lineage of Ali. To the present day, at each recurring anniversary of the tragedy, which happened 10 Oct. 680 (Anno Hegira 61), the Moslems of every land observe the death of Husain by vociferous lamentations, beating their breasts and crying, "Ya Hasan! Ya Hosein!" A passion play, based on the subject, is now a recognized religious ceremonial among millions of Mohammedans. In India the celebration is known as the "Hobson-Jobson," an Anglo-Saxon mutilation of "Hasan-Husain," probablv invented by soldiers. (See CALIPHATE; MOHAMMED; OMMIADS). Consult Muir, W., 'Life of Mohammed' and 'The Caliphate' (London).

HASCALL, Milo Smith, American soldier: b. Le Roy, Genesee County, N. Y., 5 Aug. 1829; d. Oak Park, Ill., 30 Aug. 1904. He was graduated from West Point in 1852, resigned from the army, practised law in Indiana, entered the Federal army as a private at the outbreak of the Civil War, rose to the grade of brigadier-general of volunteers, distinguished himself at the battle of Stone River, where he saved the day; was present at the siege of Atlanta. and resigned his commission in 1864. Subsequently he was a banker at Goshen, Ind., and a real estate dealer in Chicago.

HASDRUBAL, hăs'droo-bal, Carthaginian general. He was the son of Hamilcar Barca, and brother of Hannibal (q.v.), and on the departure of the latter for Italy, 218 B.C., was left in command of the army in Spain. Hanno, who had charge of the province north of the Iberus, was defeated and dispossessed by Cn. Scipio before Hasdrubal could come to his aid. Scipio, reinforced by his brother, now crossed the Iberus, and in 216 defeated Hasdrubal near that river. The Carthaginians then sent a force, intended for the assistance of Hannibal, to the relief of Hasdrubal under the command of his brother Mago. In 212 Cn. Scipio was defeated and killed by the Carthaginians. Publius Scipio was sent into Spain in 211, and after seizing New Carthage defeated Hasdrubal in his camp at Bæcula in 209. Hasdrubal, withdrawing to the northern provinces, determined to proceed to Italy, leaving his colleagues, Hasdrubal, the son of Gisco, and Mago, to make head against Scipio. He crossed the Alps in 207, accompanied by Gallic allies, and descended into Italy, and sent messengers to concert a junction with Hannibal in Umbria, but his dispatches fell into the hands of the consul, Claudius Nero, who joined his colleague, M. Livius, at Sena, and forced Hasdrubal to give battle on the right bank of the Metaurus. Being outnumbered, and ill-supported by his Gallic allies, he was defeated, after an obstinate engagement, in which both sides suffered severely. When he saw the battle irretrievably lost he rushed into the midst of the enemy, and perished fighting sword in hand. Nero hastened back to Apulia, and is said to have announced to Hannibal the defeat of his brother by causing Hasdrubal's head to be thrown into his camp, 207 B.C.

HASHIMOTO SANAI, hăh-shē̆ē-mō-tō̆ săh'-nigh, the Mazzini of Japan: b. Fukui, 18 June 1834; d. Yedo, 7 Oct. 1859. At a time when Japan was a hermit nation and men's ideas were local and narrow, and while they were violently opposed to foreign trade and intercourse, this man advocated both, urging also the importation and employment of American teachers. In vision and argument he stood where Japanese men of light and leading stand to-day. Son of a physician in Fukui (q.v.), he was a brilliant student in the classics and in Dutch, going also to the large cities to seek out famous teachers. He welcomed Yokoi (q.v.) to Fukui and began an academy with a European curriculum. He had great plans for Japan as a world power, through internal regeneration, proposing national government in a unified nation with ministries or boards of administration, and the Mikado in supreme power — the reality of to-day. For these opinions, backed by action in Kioto, he was seized by the Yedo police, his house was searched, papers were examined, and he was taken to Yedo and beheaded. His voluminous writings, in lucid and vivifying style, were published in Tokio in 1907. Posthumous honors from the emperor have been heaped upon his memory, several biographies written and the 50th anniversary of his death was in 1909 celebrated nationally. His brother Tsunétsuna, court physician and president of the Red Cross Society in Japan, died in 1908. Consult Brinkley, 'A History of the Japanese People' (1915).

HASHISH, hĕsh'ēsh, an Eastern narcotic preparation, made from the tops and tender parts of the cultivated hemp, the variety known as *Cannabis Indica* being chiefly employed. The resin picked from the hemp is kneaded together, or sometimes the drug is obtained by decoction or infusion of the leaves. The resin is taken in the form of pills or pellets, and the leaves are chewed, or smoked in conjunction with tobacco. It is called bhang in India, where it is mixed with sugar and eaten as confectionery. It is as powerful as opium and produces intoxication and hallucinations; sometimes transporting the hashish-eater into an ecstasy, or lulling him into somnolency or torpor. Its after-effects are not so depressing as those of opium and it is often prescribed medicinally as a soporific or anti-spasmodic.

HASKELL INSTITUTE. See INDIAN, EDUCATION OF.

HASKINS, Charles Homer, American historical scholar: b. Meadville, Pa., 21 Dec. 1870. He was graduated from the Johns Hopkins University in 1887, studied also at Paris and Berlin, was instructor in history at Johns Hopkins in 1889–90, and in the University of Wisconsin was successively instructor in history (1890–91), assistant professor (1891–92), and professor of European history (1892–1902). In 1899–1900 he was a lecturer in history at Harvard, and in 1902 was appointed professor of history there. He became Gurney professor of history and political science in 1912, and has been dean of the Graduate School of Arts and Sciences, Harvard University, since 1908. He is member of many learned societies. He has published various articles and special studies on the study and teaching of history, mediæval university life, mediæval Latin literature, the mediæval Church, and the history of Anglo-Norman institutions, and 'The Normans in European History' (1915).

HASSALL, Arthur, English historian: b. Bebington, Cheshire, England, 28 Sept. 1853. He was educated at Oxford, where he has been at various times since lecturer, tutor and examiner. He is one of the recognized authorities upon European history, his published books including 'Life of Bolingbroke' (1889); 'Louis XIV' (1895); 'Handbook of European History' (1897); 'The Balance of Power 1715–89' (1896); 'Class-Book of English History' (1901); 'History of France' (1901); 'The Tudor Dynasty' (1904); 'Survey of European History' (1906); 'War and Reform' (1906); 'The Expansion of Great Britain' (1907); 'The Great Rebellion' (1909); 'Modern Europe' (1910); 'History of British Foreign Policy' (1912).

HASSAM, Childe, American artist: b. Boston, 1859. He studied art in Boston and Paris; he is a member of Ten American Painters, of New York, and of the Société Nationale des Beaux Arts of Paris. He is one of the freshest in style and most original of the American impressionists, and has gained medals at Paris, Munich, Chicago and Philadelphia.

HASSELQUIST, häs'sĕl-kwĭst, **Fredrik,** Swedish naturalist: b. Törnevalla, East Gothland, 1722; d. Smyrna, 9 Feb. 1752. In 1741 he went to the University of Upsala, where his talents and industry drew the attention of Linnæus. In 1747 he published a dissertation 'De Viribus Plantarum.' Wishing to make researches on the spot into the natural history of Palestine he spent some time at Jerusalem, and afterward visited other parts of the country. Returning to Smyrna he brought with him a collection of plants, minerals, fishes, reptiles, insects and other natural curiosities. The Swedish queen, Louisa Ulrica, purchased the whole of Hasselquist's acquisitions, which were deposited in the castle of Drottningholm. Linnæus, from the papers and specimens of natural history collected by his pupil, prepared for the press the 'Iter Palæstinum, or Travels in Palestine, with Remarks on its Natural History' (1757), which has been translated into English and other European languages.

HASSEN BEN SABBAH, the founder of the sect of the Assassins (q.v.).

HASSLER EXPEDITION, a scientific expedition of great importance dispatched by the United States government. In 1871 the steamship *Hassler* was fitted out for coast survey and marine exploration. The personnel of the expedition included Prof. Louis Agassiz and Mrs. Agassiz; Dr. F. Steindacher, ichthyologist; Dr. Thomas Hill, botanist; Count L. F. de Pourtales, Mr. J. A. Allen and others. The party left Boston 4 Dec. 1871 and reached San Francisco, August 1872. Deep-sea dredging was carried on at several points in the West Indies and South Atlantic. The glaciers in the neighborhood of the Straits of Magellan were explored. Collections were made at every point of the voyage; the results of the expedition have been published by Agassiz, Lyman and Pourtales, and much valuable material, zoological, geological and botanical, deposited in the Museum of Comparative Zoology, Cambridge.

HASTINGS, hās'tĭngz, **Francis Rawdon,** 1ST MARQUIS OF HASTINGS and 2D EARL OF MOIRA, English soldier and statesman: b. 9 Dec. 1754; d. off Naples, 26 Nov. 1826. He entered the army as an ensign, served in America during the Revolution, and on 25 April 1781 gained the battle of Hobkirk's Hill, which Lord Cornwallis described as the most splendid of the war. In 1781 he was elected a member of the Irish House of Commons, and two years later he was promoted to the English House of Lords with the title of baron. He was in command of a force which sought to aid the royalists in Brittany in 1793, and in the following year co-operated with the Duke of York in the Netherlands. In 1812 he was appointed governor-general of Bengal and commander-in-chief of the forces in India. His administration was distinguished by successful wars against the Ghurkhas of Nepaul and the Pindarees of central India, but in 1821 he resigned because certain charges had been brought against him in connection with a banking firm in which he was interested. In 1824 he was appointed governor of Malta.

HASTINGS, Hugh, American journalist: b. Albany, N. Y., 1855; d. New York, 28 July 1916. He entered newspaper work on the Albany *Knickerbocker,* then owned by his father. Later he went to New York and was employed on several dailies. He was regarded as one of the best political writers in the country. In 1915 he became the publisher of the Cohoes (N. Y.) *Republican,* after having been managing editor of the Albany *Journal* for a number of years. He was appointed State historian when the office was created during the administration of Levi P. Morton in 1895–96, and held the position until 1907, when he resigned to become tax commissioner under Mayor McClellan. As State historian he compiled many valuable records, notably the military record, the ecclesiastical record of the State and the papers of Governors George Clinton and Daniel D. Tompkins.

HASTINGS, James, Scottish clergyman and encyclopedist: b. Huntly, Aberdeenshire. He studied at Aberdeen University and at the Divinity College of the Free Church in Aberdeen. He was ordained in 1884 and held successive pastorates at Willison Church, Dundee (1897); Saint Cyrus Church (1901). After 1911 he abandoned active pastoral duties in order to devote himself to literary pursuits, and published numerous excellent dictionaries: 'The Dictionary of the Bible' (1898–1902); 'Dictionary of Christ and the Gospels' (1906–07); 'Dictionary of the Bible' in one volume (1908); 'Dictionary of the Apostolic Church' (1915–17). In 1908 he undertook the publication of 'Encyclopedia of Religion and Ethics,' of which nine volumes were in print up to 1917, and in 1910 was commenced his series called 'The Great Texts of the Bible'; in 1913 a series of 'The Greater Men and Women of the Bible' and 'The Great Christian Doctrines,' of which Volume I, on 'Prayer,' appeared in 1915. He was also founder and editor (1890–1917) of the *Expository Times.*

HASTINGS, Warren, English soldier and administrator: b. Churchill, Oxfordshire, 6 Dec. 1732; d. Daylesford, Warwickshire, 22 Aug. 1818. An uncle in London sent him at 10 years of age to Westminster School. On the death of his uncle he obtained an appointment in the East India Company's service and arrived at Bengal in October 1750. He was appointed to the factory at Cossinbazar and was taken prisoner by Surajah Dowlah (1756). On obtaining his freedom he joined Clive, under whom he served with distinction as a volunteer in his campaign of 1757. In 1758 he was appointed resident agent of the company at Moorshedabad, in which capacity he continued to act till 1761. It is recorded to his honor that he did not avail himself of the opportunity of making his fortune in the mode then common among the servants of the company, by «presents» (forced) from the native princes. In 1764 he returned to England, but as a result of a bad investment of his fortune was compelled again to ask for employment from the company; and sailed for India in the spring of 1769. In 1771 the East India Company were contemplating extensive changes in the government of India. The government of Bengal was still carried on in the name of the nabob, although he had become a mere cipher, all his officers being appointed by the company, and they cast their eyes upon Warren Hastings as a fitting instrument to carry out their policy. Clive strenuously supported his appointment to the Calcutta council (1772), with succession as president of the council and governor of Bengal. He now received instructions from the directors to deprive of his offices Mohammed Reza Khan, who had exercised under the company the complete control of the revenues and administration of Bengal, and to bring him to trial for corruption. Mohammed bore a high character and he was accused by Nuncomar, a man of notoriously bad reputation. Shitab Roy, Dewan of Behar, was subjected to similar charges. After a protracted inquiry both Mohammed and Shitab were fully acquitted of all the charges against them. The object of these charges — the reorganization of the judicial and financial administration of the province under the direct control of the company's officers, had in the meantime been carried out by Hastings to the entire satisfaction of the directors. Another important step taken by him was to enter into a treaty with the Nabob of Oude (Treaty of Benares, 7 Sept. 1773), by which he ceded to him the districts of Corah and Allahabad for 50 lacs of rupees, and engaged to hire out the company's troops to him for the reduction of the Rohillas, whose territory the nabob coveted. By the subsequent act of 1773, Hastings was appointed first governor-general of India, and a supreme council was named, of whom three formed a majority unfavorable to Hastings. The natives were encouraged to bring charges against him, and Nuncomar, his old ally, came forward with various charges of bribery. A Supreme Court of Justice had been appointed at the same time with the supreme council of Calcutta. The chief justice, Sir Elijah Impey, its head, was a friend of Hastings. Nuncomar was brought before this court, charged with forgery, convicted and executed. This stretch of jurisdiction, which Hastings could easily have prevented, alienated from him public sympathy in England. The directors of the company petitioned the Crown on 8 May 1776 for his removal from the council. Hastings had deputed Colonel MacLean, who returned to England in 1776, to insist on certain conditions or tender his resignation. It was accepted and a successor appointed to take his place in the council, 23 Oct. 1776. General Clavering assumed the title of governor-general, which Hastings still insisted on retaining, as the change had been made without the conditions he had appended to his resignation. The Supreme Court, which was appealed to, decided in favor of Hastings. To end a dispute between the council and the Supreme Court of Calcutta, and to bring the chief justice under the influence of the council, Hastings now appointed Sir Elijah Impey superintendent of the native courts with a salary of £8,000 a year, an appointment regarded by some as equivalent to a bribe. He involved himself in disputes with the Madras government, made demands for a large war contribution upon the Rajah of Benares, and when the rajah resisted arrested and deposed him. He caused the «begums of Oude,» mother and grandmother of the Nabob of Oude, to give up extensive estates in land and a large amount of treasure. The House of Commons had passed a resolution (30 May 1782) requiring the directors to pursue all legal and effectual means for his removal. In November 1784 he resigned his post, and in February 1785 left India. In 1786 articles of impeachment were brought in by Burke against him. The preliminary forms were gone through from 13 to 14 February, and Burke opened the charges against him in a speech of three days' duration, begun on the 15th. He was supported by Fox, Sheridan and Grey. Hastings began his defense on 2 June 1791, and on 17 April 1795 was acquitted by large majorities on all the charges. His acquittal met with general approval. The legal expenses of his trial amounted to £76,080. The company in 1796 settled on him an annuity of £4,000 a year for 28½ years, and lent him £50,000 for 18 years free of interest. He passed the remainder of his life in retirement. In 1813 he received the degree of LL.D. from the University of Oxford, and in 1814 was created a privy councillor. Consult 'Lives' by Gleig (3 vols., 1841), Lyall (1902), Malleson (1894) and Trotter (1878); 'The Private Life of Warren Hastings,' by Lanson (1911); and 'Letters to His Wife' (1905); Macaulay's 'Essay' (distorted in view); and Forrest, 'The Administration of Warren Hastings' (1892).

HASTINGS, Mich., city and county-seat of Barry County, on the Thornapple River, and on the Chicago, Kalamazoo and Saginaw and the Michigan Central railroads, about 38 miles west by south of Lansing and 32 miles southeast of Grand Rapids. The city is in a fertile agricultural region. The chief manufactures are furniture, pumps, wagons and carriages, hose-reels, car-seats, flour, cigars, felt boots and lumber camp supplies. The principal buildings are the library, the city hall, jail and courthouse. The city owns and operates the waterworks. Pop. 4,383.

HASTINGS, Minn., city and county-seat of Dakota County on the Mississippi River, at the mouth of the Vermilion River, and on the Chicago, Milwaukee and Saint Paul Railroad, about 15 miles southeast of Saint Paul. Its chief industrial establishments are breweries, a malthouse, flour-mills, grain-elevators, saw- and planing-mills, sash, door and blind factories, carriage and wagon factories, furniture factories, lumber and brickyards, gas engine and boat works, file works, sprayers and time-recorder manufactories. In addition to the trade in manufactured articles, grain, lumber and live stock are among the important shipments. A State insane asylum is situated here, and there are a city hospital and courthouse. The Mississippi is spanned here by a bridge which has a spiral approach, so designed in order to avoid the business section, which is on the river front. The waterworks are the property of the city. Pop. 3,983.

HASTINGS, Neb., city in Adams County, on the Missouri Pacific, the Burlington and Quincy, the Saint Joseph and Grand Island and other railroads, about 25 miles south of Grand Island and 95 miles west of Lincoln. Its first settlers were Eastern people who availed themselves of the benefits of the government "Homestead Act," but the city was not incorporated until 1874. It is in a fertile agricultural section. The chief manufactures are flour, wagons and agricultural implements. The trade is principally in wheat, corn and live stock. It is the seat of Hastings College, under the auspices of the Presbyterian Church, and opened in 1882, and of the State asylum for chronic insane, and has a fine city hall, three public parks and the Lanning Hospital. The government is vested in a mayor, who holds office two years, and in a city council. The present charter is that of 1891. The city owns and operates the electric-light plant and the waterworks. Pop. 9,338.

HASTINGS, Battle of. See SENLAC.

HASTINGS-UPON-HUDSON, N. Y., village in Westchester County, on the Hudson River and the New York Central and Hudson River Railroad, about three miles north of Yonkers and 20 miles from New York. It is largely a residential village, but in the vicinity are marble quarries which add to the industrial wealth of the place. It has some manufactures, chiefly chemicals, bricks, dyestuffs, copper-wire cable, sheet and tube copper and brass, asphalt paving bricks and cigars; it has a large trade in coal and lumber. It is the seat of the Hastings Commercial and Collegiate Institute, The New York Orphan Asylum Society and has several churches and good schools. Pop. 4,552.

HASWELL, Charles Haynes, American engineer: b. New York, 22 May 1809; d. 12 May 1907. His practical education as marine and mechanical engineer was learned in a steam-engine factory. In 1836 he was appointed chief engineer in the United States navy. He was a member of the boards which designed the *Missouri* and other steam frigates, including the *Mississippi*, which was Perry's flagship on the expedition to Japan in 1853. He was in charge during the transition from paddle wheels to screws for propulsion and from wood to iron for hull construction. He left the department in 1850, and superintended the construction of a crib bulkhead at Hart's Island, New York. He built the first practical steam-launch in 1837 and was the first to use zinc to protect the hulls of iron vessels and boilers from the galvanic action of salt water and copper. After 1898 he was the consulting engineer of the board of public improvements in New York city. His published works include 'The Mechanics' and Engineers' Pocket Book' (1901); 'Mechanics' Tables' (1854); 'Reminiscences of an Octogenarian' (1895).

HATCH, John Porter, American general: b. Oswego, N. Y., 29 Jan. 1822; d. 12 April 1901. He was graduated at West Point in 1845 and rose through successive grades to lieutenant-colonel of cavalry in 1873. He served in the Mexican War from Palo Alto to the capture of the city of Mexico; and in the Civil War was appointed brigadier-general of volunteers in September 1861, and commanded a cavalry brigade in the Shenandoah Valley and northern Virginia. He was wounded in the second battle of Bull Run, but recovered and was in charge of a division in the battle of South Mountain, where he was again wounded and had two horses killed under him. He subsequently commanded various districts in the South; and was brevetted major-general of volunteers in 1865, and was made colonel of the Second Cavalry in 1881, and retired in 1886.

HATCH, Rufus, American banker: b. Wells, York County, Me., 1832; d. 1893. He began life as clerk in a grocery store, in Rockford, Ill., in 1854 entered the grain commission business in Chicago and amassed a fortune. He managed the Chicago and Northwestern Railroad combination in 1868 but made a financial failure in the Northern Pacific collapse of 1883.

HATCH, William Henry, American lawyer: b. Georgetown, Ky., 1833; d. 1896. He was admitted to the bar in 1854; served through the Civil War in the Confederate army, and was a member from Missouri in the United States House of Representatives from 1879 to 1895. The Hatch Act, which distributed Federal aid to agricultural experiment stations in all the States and Territories, was inspired by him.

HATCH ACT, a bill introduced by William Henry Hatch (q.v.) and approved 2 March 1887, for the purpose of diffusing «useful and practical information on subjects connected with agriculture and to promote scientific investigation and experiment respecting the principles and applications of agricultural science.» The act further granted the sum of $15,000 a year to each State for the purpose of establishing and maintaining agricultural experiment stations. This supplemented the government grants of public lands made 2 July 1862 to each State to provide colleges for teaching agriculture and the mechanic arts. Subsequent legislation raised the annual government grants for each State to $35,000.

HATCHEE, or **BIG HATCHEE,** a river which has its rise in the northeastern part of the State of Mississippi, flows north by west into Tennessee, then northwest and west joining the Mississippi River about 30 miles in direct line above Memphis. It is navigable for small steamboats as far as Bolivar, about 100 miles from its mouth, or half its whole length. The area drained by the Hatchee, about 4,000 square miles, is excellent cotton land.

HATCHER'S RUN (BOYDTON ROAD), **Battle of.** On 27 Oct. 1864, General Grant, with the intention to extend his lines to the South Side Railroad, and under the belief that the Confederate works around Petersburg extended only to the Boydton road crossing of Hatcher's Run and were but feebly manned, moved parts of the Ninth, Fifth and Second corps, together with Gregg's cavalry division, in all about 38,000 men, in three columns to the left. General Parke, commanding the Ninth corps, moving to surprise the right of the Confederate works, found them strongly held and made no attack. The Fifth corps, on the left of the Ninth, crossed Hatcher's Run and endeavored to seize the bridge by which the Boydton road crossed that stream, and was repulsed. The Second corps and Gregg's cavalry succeeded in forcing a passage over Hatcher's Run by the Vaughan road, and reaching the Boydton road, moved down it to Burgess' Tavern, near the bridge over Hatcher's Run, some four miles above Armstrong's Mill, where the infantry was checked. Hancock's Second corps having effected the passage of Hatcher's Run, by the Vaughan road, Warren was ordered to cross Crawford's division of the Fifth corps at Armstrong's Mill and, sweeping up the right bank of the stream, endeavor to recross and assault the Confederate line in the rear, while Griffin's division assaulted in front. Hancock was advised of the orders given Warren and authorized to make the attempt to carry the bridge in his front and gain some high ground beyond. At 4.30 P.M., when Hancock was extending his right to connect with Crawford, and was about to assault the bridge, General Heth, with his own division and a part of Mahone's, having crossed Hatcher's Run and penetrated the interval between Hancock and Crawford, vigorously attacked Hancock's right and rear, throwing it into some confusion and capturing many prisoners, but Heth was finally repulsed. At about the same time Hampton, with five cavalry brigades, attacked Hancock's left and rear and Gregg's cavalry, but was repulsed. Crawford, who had crossed at Armstrong's Mill, found great difficulty in moving up the bank of Hatcher's Run, and failed to make connection with Hancock. The object of the entire movement failed, with Hancock still six miles from the South Side Railroad. The Union troops were withdrawn during the night and, next day, moved back to the line of entrenchments. The Union loss, the greater part of which fell upon the Second corps, was 1,194 killed and wounded, and 564 missing. The Confederate loss is unknown. Consult 'Official Records' (Vol. XLII); Humphreys, 'The Virginia Campaign of 1864-65'; Walker, 'History of the Second Army Corps'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV).

HATCHER'S RUN (DABNEY'S MILL and ARMSTRONG'S MILL), **Battle of.** It was on 5 Feb. 1865 that General Grant put in motion an expedition to interrupt the Confederate line of communication by the Boydton road, running through Dinwiddie Court House to Petersburg. Gregg's cavalry division was directed to march early in the morning by way of Ream's Station to Dinwiddie Court House and strike the road; Warren's Fifth corps was to cross Hatcher's Run and support Gregg; General Humphreys, commanding the Second corps, was ordered with two divisions to the crossing of the Vaughan road over the Run, and to Armstrong's Mill, to hold these two points and to keep up communication with Warren, four miles distant, on the one side, and with Miles' division in the Union entrenchments, three or four miles distant, on the other side. After severe skirmishing, Humphreys pushed Motts' division to the south side of Hatcher's Run and established Smyth's division at Armstrong's Mill on the north side, about 1,000 yards from the Confederate works, where two brigades were brought to Smyth's support. At 5 P.M. parts of A. P. Hill's and Gordon's corps came out of their works and, under cover of the woods, attacked Smyth, but were repulsed. Smyth's line was now further strengthened by Hartranft's division of the Ninth corps and Wheaton's of the Sixth. Gregg captured some wagons and prisoners on the Boydton road, and in the evening fell back to Malone's Bridge on Rowanty Creek, from which he moved up to the Vaughan road crossing, where he arrived early in the morning of the sixth, with Warren, who had been ordered to support Humphreys. About 1 P.M. Warren, with two divisions, moved along the Vaughan and Dabney's Mill roads; Gregg, supported by one of Warren's divisions, going down the Vaughan road to Gravelly Run to observe the left. Gregg was attacked by a part of Pegram's division, but held his ground and, with the support given him by part of Griffin's division, drove Pegram's men back. Warren's leading division (Crawford's) moving on the Dabney's Mill road, also encountered part of Pegram's division, which was forced back to Dabney's Mill, where Evans' division came to Pegram's support, and Crawford in turn was driven back. Three Union brigades were now brought up to Crawford's support and, at the same time, Mahone's division arrived and took position between Evans and Pegram, and the whole Confederate line advanced, driving Warren back in great disorder, but some of his men rallied upon Wheaton's division, which had crossed from the north bank of the stream, and the Confederates were checked. On the morning of the seventh Warren made a reconnoissance, but did not find the enemy in force. The Union works were now extended to Hatcher's Run at the Vaughan road crossing. The Union loss was 1,352 killed and wounded, and 187 missing. The Confederate loss was about 1,500, among the killed being Gen. John Pegram. Consult ‹Official Records› (Vol. XLVI); Humphreys, ‹The Virginia Campaign of 1864–65›; Walker, ‹History of the Second Army Corps›; Powell, ‹History of the Fifth Army Corps.›

HATCHETTITE, ADIPOCERITE, or MINERAL ADIPOCERE, a native hydrocarbon, probably of the nature of a paraffin, occurring in certain parts of England and Scotland, mainly in connection with bogs and coal measures. It is wax-like, and melts at about 115° F. The specific gravity of the natural mineral is about 0.61, but after melting the specific gravity rises to 0.92 or even higher, owing to the elimination of air bubbles. Hatchettite is without odor, and when fresh it is commonly translucent and yellowish. Upon exposure, however, it blackens and becomes opaque.

HATCHIE RIVER, or DAVIS' BRIDGE, Battle of. After General Van Dorn's defeat at Corinth, Miss., 4 Oct. 1862, he retreated and bivouacked for the night at Chewalla. Early on the morning of the fifth he continued his retreat on Pocahontas, but when his advance had crossed Hatchie River, at Davis' Bridge, he was met by General Hurlbut's division, which had been sent by General Grant from Bolivar, Tenn., to Pocahontas to intercept his retreat. Van Dorn's advance was driven back across the bridge, his main body came up, and General Ord, who had arrived on the field from Jackson, took command of Hurlbut's division and attacked Van Dorn vigorously. A severe engagement ensued, in which Ord was severely wounded, and Hurlbut resumed command of the Union troops. Van Dorn, not closely followed from Corinth by Rosecrans, who was 12 miles away, held his position before Hurlbut the greater part of the day and, cut off from his route through Pocahontas, continued his retreat on the east bank of the Hatchie for six miles to Crum's Mill, where he crossed his army on a bridge during the night and continued his retreat to Ripley and thence to Holly Springs. Rosecrans followed as far as Ripley, when Grant ordered him to return to Corinth and Hurlbut to Bolivar. See Corinth, Advance on and Battle of.

HATCHMENT (a corruption of achievement, coat of arms), a funeral escutcheon, the arms of a deceased person within a black lozenge-shaped frame meant to be placed on the front of his home where it remained for a year, and was then taken down and placed in the church. If the deceased was unmarried or a widower or widow, the whole field of the escutcheon is black. In the hatchment of a married person the arms of husband and wife are impaled, and only that part is black which adjoins the side of it occupied by the arms of the deceased. Thus, in the hatchment of a husband the dexter side is black, the sinister white; in that of the wife the reverse. In a bishop's hatchment his arms being impaled with that of the see, those of the see have a white background. When the deceased is the last of his race a skull is set above the shield in place of a crest.

HATFIELD, James Taft, American German scholar: b. Brooklyn, N. Y., 15 June 1862. He was graduated from the Northwestern University in 1883; from the Johns Hopkins University in 1890; was appointed professor of German language and literature at Northwestern in 1890. During the Spanish-American War he served from seaman to chief yeoman on board the cruiser *Yale*. His publications include ‹German Lyrics and Ballads› (1900); ‹From Broom to Heather› (1903); editions of Freytag's ‹Rittmeister von Alt-Rosen›; Goethe's ‹Hermann und Dorothea› and ‹Egmont›; ‹Gedichte von Wilhelm Müller› (complete critical ed., Berlin 1906) and various articles and monographs on subjects of German literature.

HATHAWAY, Anne, the wife of Shakespeare. See Shakespeare.

HATHOR. See Athor.

HATS AND HAT MAKING. It is difficult to state just when hats were first worn, but it is a fact that fur-felt hats now form part of the attire of civilized man the world over. There is no record as to when or where the first hat was made. We find head covering in one form or another in vogue in the earliest times referred to in history. The first modern hat, as we now know this article of men's wear, was made in Paris about 1404 by a Swiss manufacturer, but it was not until 49 years afterward that the French adopted any sort of a head covering. Charles XII, upon his entry in triumph into the city of Rouen in 1453, wore a huge hat made of fur, lined with red velvet, from which protruded a great feather. With royalty as its sponsor the hat at once became a necessary detail of man's wardrobe. The hat is distinguished from the cap or bonnet by its continuous brim. It has been traced back to the «petasus» of ancient Greece, just as the cap has been regarded as the descendant of the brimless «Pileus,» also a form of Grecian head attire. These articles, as far as we know, were made almost exclusively of felt.

Felt hats became popular in England during the Norman occupation. In Queen Elizabeth's reign great beaver hats, usually black, were the favorite among the nobility, and they remained in vogue for more than 300 years. About the middle of the 17th century an effort was made to encourage this industry in America. In 1662 the assembly of Virginia, to stimulate activity among the colonists, offered, by special enactment, to give 10 pounds of tobacco for every good wool or fur hat produced in that colony from materials taken from animals native thereto. Hats were then made by hand, and no effort of any consequence was made to improve the primitive conditions until 1820, when the energy of the American inventor produced the first labor-saving machine. Improvement now followed improvement, each one, in its way, tending to economize the cost of making.

In 1810 the silk hat appeared. It was made by hand, and failed in its purpose to supplant the tiled beaver. It was not until 1830 that the silk plush hat was manufactured upon a paying basis.

In 1849 the soft felt hat made its bow in the United States. Its sponsor was the famous Hungarian patriot, Kossuth, who visited America in that year. He was given tremendous receptions everywhere, and won the heart of the great American republic. His great hat seemed to be typical of the vigorous character of the man, and it was not surprising that the «Kossuth» became a general favorite. From that time the soft hat has steadily gained friends, and to-day in many sections it is a predominant type.

While the industry in this country, prior to the Civil War, kept pace with progress in other lines, it was not able to hat the heads of thousands of Americans, and the foreign manufacturer found the States a very profitable territory. But to-day America has become a great exporter of hats. This foreign trade is controlled by the cities of New York and Philadelphia, where the finest grades of hats in the world are made. The other well-known hat centres in America are Orange and Newark, N. J., Danbury, Bethel and Norwalk, Conn., Brooklyn, N. Y., and Reading, Pa.

The kinds of hats now made are so numerous as to be almost beyond the possibility of listing. There are, however, three principal classifications: the felt hat, which includes the soft and the stiff or derby shape, the silk hat and the straw hat. All other kinds are but variations in some way of these three.

Felt Hats.—The principal material of which felt hats are made is the fur of the European rabbit or cony and of the European hares. The finer grades are made of the fur of the South American nutria, and a limited quantity from the fur of the Canadian beaver, mink and muskrat. For some fine hats mixtures of these furs are made.

The quality of the felt when finished depends upon many seemingly insignificant details, and these begin to have their effect in the condition of the fur itself at the time it reaches the market. The method by which the animal was killed, the time which elapsed before it was skinned, the conditions of temperature and humidity in which the skin was kept before reaching the hat maker — all these have their effect upon the appearance and quality of the finished hat. Other particulars which affect the strength and character of the felt eventually produced are the lengths and diameters of the individual fibres of fur used and the part of the pelt from which they are taken.

The first process to which the fur is submitted is known as «carroting,» a chemical cleansing with a solution of nitrate of mercury. This has the effect of opening the upper edges of the nested rings of which true fur is composed, leaving a sort of serrated texture which permits the interlocking of the fibres under the influence of moisture and pressure into a true felt. This preliminary treatment of the fur is generally carried out in a so-called «fur factory,» the prepared fur after being sheared close to the skin being delivered to the hat maker for the separation of such of the fibre as is suitable for his purpose, the remainder being returned to the fur factory to be used in other ways. At the hat factory the various furs are mixed in established proportions and thrown into a mechanical mixer in which the teeth on swiftly revolving wheels tear the fibres apart from one another. The fluffy mass is then put into a blowing machine in which currents of air at varying velocities deposit the fibres of different weights on different traveling belts, which in turn carry them to other revolving toothed separators, until the intermixture is as complete as possible. The mixed and blown fur is then divided by weighing into portions, each suitable for the making of one hat. One such portion is taken by the operator of the forming machine who spreads it upon an apron which feeds into one end of a boxed-in machine. At the farther end of the box there is a large perforated cone of sheet copper, revolving rapidly over a funnel, under which there is a powerful suction fan at work. As the attendant carefully feeds the fur to the machine in the proper quantity it is carried by the apron toward the cone. The suction of air attracts this fur and causes it to adhere to the surface of the cone. This continues until the cone is covered with a sufficient quantity of fur to make the hat. The whole operation requires only two or three minutes. As soon as the cone has accumulated the necessary fur a wet cloth is thrown over it, and a second cone, larger in dimension, is placed over that. Both are immersed in a tank of hot water for a few moments. This is the first stage of the felting. It causes the adhesion of the various fibres. The operator slips this conical body from the cone. It is now a cone of fur about three feet in height and six feet around the base, and one-eighth of an inch in thickness.

Sizing, as the felting is termed, is the next process. The body, which has just been removed from the cone, is placed in a sizing kettle, where it is shrunk in hot water. Continuous kneading and rolling further reduces it in size. It still retains its cone shape, but it is now firmly felted. Care as well as skill is required to ensure the even shrinking and the uniform distribution of the fur. Failure in any detail will cause streaks and weak spots in the finished article. The hat is now ready for dyeing. It is immersed in a great color vat and dyed to meet the prevailing fashion. Great improvements have been made in this detail during the past few years. The old wood colorings have been discarded, and coal-tar products are now used because they have been found more serviceable and increase the durability of the hat. Up to this point the manufacturing of stiff and soft hats has been along similar lines, but from this time on different methods are used. After dyeing the next step is to stiffen the hat slightly by the application of «water stiff,» a weak solution of shellac. The brim receives a much stronger stiffening. The body is now beginning to assume a definite form. It is stretched, blocked and pulled, and, with the aid of hot water, steam and ingenious machinery, it is given stability of shape and form. The rough surface must now be cut off. This operation requires great care. If too much of the fur is removed all the previous skilled manipulation becomes valueless and the hat is ruined. This operation is known as «pouncing.» It was formerly accomplished with a great deal of hand labor. It is now done by a machine and emery paper. This machine is a great time saver, and greatly facilitates the production of the plant. The crown is next given its shape, as demanded by the style. It is stretched over wooden blocks, ironed and re-ironed, then dried. It is next placed in an oven and heated and then placed in a steel mold into which it is pressed evenly and firmly by a rubber bag through which water is being pumped. The cool water sets the felt in the shape of the mold. It must then be carefully pounced by hand and steamed to tighten the felt. The brim must be treated exactly the same way, although it is not given shape at this time. Only men of skill and experience can engage in this portion of the work. There is a knack about pouncing by hand that can be acquired only by experience.

The hat is next flanged, or, rather, the brim is given its shape. The brim is placed upon a flange of metal or wood so as not to affect the crown. The entire hat resting on the flange is then placed under a huge receptacle containing heated sand and having on the under side a heavy cotton fabric, which comes in direct contact with the felt. After remaining in this position for several minutes the brim of the hat has its correct shape and trimming is in order. The turning up and edging each play an important part in the final process of shaping. In trimming artistic treatment is a necessity. Care must be taken in attaching the bands and bindings to preserve the neatness as well as the character of the design. The insertion of the sweat leather must be carefully done. All these and other details add greatly to the appearance and durability of the finished product.

The stiffening of the derby, better known as «the stiff hat,» because of the character of the felting, is an interesting process. The hat body is impregnated with a solution of shellac and alcohol of given density. This substance is carefully worked into the heart of the body, and as a result the felting attains a condition of firmness. The hat is then placed on a wooden block, is immersed in hot water and is given the proper proportion and shape before the final pressing. At the conclusion of this operation the superfluous gum is cleared away by a soda bath. When dry the hat is rigid throughout. It is then placed in an oven and kept there until it becomes pliable. A mold, to which tremendous pressure is given by mechanical or hydraulic means, completes the pressing after the derby has been pounced or finished. The pouncing of a derby is done upon a lathe. It is placed on a wooden block similar to the molds used in pressing. Should the operator cut off too much of the surface fur, thus destroying the nap, the stiffening will be exposed and the work of the skilled men who preceded him loses its value. The binding is then put around the brim. Curling or shaping of the brim is done usually with a press, but in the finer grades of hats it is done by hand with a variety of small tools, heat, steam, deftness of fingers and a good eye. The work of some of the experts who develop the stiff hat brims by the eye is little less than marvelous. The trimming, etc., of stiff hats require even greater care than in the case of soft hats.

Silk Hats.— The body of a silk hat is made up of several layers of cotton fabric cemented together with a solution of shellac in alcohol. It is formed on a block by the pressure of hot irons, and the rim is formed upon a flange on the bottom of the block, and cemented to the body. The whole is then coated with the shellac solution and covered with a specially made silk plush. The cover and the body are unified by hot ironing. The silk is polished with velvet brushes, and the rim is bound and the linings put in. The final process is giving the curl to the rim, and this is done in a heated press where the hat remains until it is cold.

Panama Hats.— The so-called Panama hats are made in Ecuador, and in a few localities in Colombia and Peru. The material used is the immature unopened leaves of the screw pine (*Carludovica palmata*). These are slit into shreds of varying degrees of fineness with a very sharp knife, the shreds being left attached to the stem and forming a bunch of 25 to 35 «straws» of from 18 to 20 inches in length. The hats are woven upon a block, the finest of them being of the texture of fine linen, and requiring months to complete. These are not often exported and bring locally the equivalent of $100 each. Practically all the «Panama hats» in the American market are made in Peru. Before the war a very good imitation was made in Germany from imported Peruvian fibre.

Straw Hats are made from straw braids imported from Italy, China and Japan. The finest grades are raised in Tuscany, Italy, where the soil and climate are the most favorable for this industry. The grain sown is a variety of wheat, and the straw is cut when the grain is in the «milk» stage. The straw is bleached in sunshine and dew, and then whitened with sulphur fumes. The upper and finer parts of the straw are plaited into braids from one-eighth of an inch to nine-thirty seconds of an inch in width, the braids being of from 9 to 13 strands, and 82 to 131 feet in length. These are known as Leghorn braids. The lower and coarser parts of the straw are plaited into widths of one-quarter to one-half of an inch, and are of from five to seven strands. These are known as Milan braids. In making the hats the braids are lapped and sewed by machinery. In some of the finer grades they are sewed edge to edge by hand. The plateaux of sewn straw are sized with a waterproof gum and shaped in powerful presses.

Other hats are made of hemp from the Philippines and Japan. The ‹Neapolitan» or horsehair hats are made in Switzerland. Chip hats are made of shreds of poplar or willow, sometimes plaited into braids, and coated with colored varnishes. The so-called «wool-felt» hats are of wool, which, however, does not felt, and the fibres are held together with cementing substances. Many other hats and caps are made of woolen or cotton cloth or other fabrics, generally stiffened more or less with shellac.

Production.— The United States census of manufactures for 1914 showed a total of 983 hat factories in the United States, not including those which made sewed hats and caps out of woolen cloth. These latter were included among the factories making woolen goods, and their output cannot be separated for a clear report.

The felt hat industry was concentrated in Philadelphia, Danbury, Conn., Newark, N. J., New York city and Orange, N. J. It was carried on in 224 factories employing 21,318 hands, and an aggregate capital of $39,401,429. The year's output was valued at $37,349,744, of which $20,402,686 was the value added by manufacture.

The straw hat industry occupied 149 factories, the larger percentage being in New York city. They employed 9,483 hands and a combined capital amounting to $12,588,754. The value of the year's production was $25,443,501, of which $11,357,715 was the value added by manufacture.

The wool-felt hat industry occupied 30 factories and the year's output was valued at $1,904,484. Other hats and caps not included above were made in 580 factories, the larger percentages being at and near New York and Philadelphia. Their combined product for the census year was valued at $18,593,221. Consult Manchester, H. H., 'Sixty Centuries of Hat Making' (New York 1915); Mills, D. C., 'The Twentieth Century Hat Factory' (Danbury, Conn., 1910); Smith, W., 'Chemistry of Hat Manufacture' (London 1906).

HATTERAS, Cape. See CAPE HATTERAS.

HATTERAS INLET, Capture of. In the forenoon of 26 Aug. 1861, a Union fleet of seven vessels carrying 143 guns, under command of Flag-officer Silas H. Stringham, and three transports, carrying 930 men and a light battery, under command of General Butler, set sail from Hampton Roads. Next afternoon the fleet arrived off Hatteras Inlet, the entrance to Pamlico Sound, which was guarded by Forts Hatteras and Clark, built by North Carolina on the south end of Hatteras Island, and mounting respectively 25 and 5 heavy guns. The forts, which were garrisoned by over 700 men, were under command of Major Andrews. At 10 A. M. of the 28th Stringham began the bombardment of the forts, and a little later about 300 troops, with two howitzers, were landed on the island above the forts. Fort Clark was silenced before noon, the greater part of its garrison retreating to Fort Hatteras, some escaping from the island by boats. At night the fleet withdrew, but renewed the attack upon Fort Hatteras early in the morning of the 29th, drove the gunners from their guns to the shelter of the bomb-proofs, and before noon the fort surrendered, after a loss of 30 killed and wounded. The Union loss was one wounded. Stringham and Butler returned to Hampton Roads, leaving three vessels as a sea-force and detachments of the Ninth and Twentieth New York and the Union coast-guard, under Col. R. C. Hawkins, to garrison the captured forts. The immediate results of the expedition were the capture of the two strong forts with their garrisons of 715 men, 31 heavy guns, 1,000 stand of arms and the possession of the best sea entrance to the inland waters of North Carolina. Consult The Century Company's 'Battles and Leaders of the Civil War' (Vol. I); Maclay, 'History of the Navy' (Vol. II).

HATTI-SHERIFF, hät'tē-shă-rēf, the Turkish name of an edict signed by the sultan, who subscribes it usually with these words: «Let my order be executed according to its form and import.» These words are usually edged with gold, or otherwise ornamented. An order given in this way is irrevocable. The firman of 18 Feb. 1856, called usually Hatti humayun, «exalted writing,» is the constitutional charter of the Turkish Empire. It is a long document, undivided into articles, and prescribing various reforms administrative and financial, etc., but its chief importance consists in its explicit recognition of the principle of religious liberty, already admitted by the hatti of Gulhana, 3 Nov. 1839.

HATTIESBURG, hăt'ĭz-bėrg, Miss., city and county-seat of Forrest County, on the Leaf River, on the Gulf and Ship Island, New Orleans and North Eastern, Mobile, Jackson and Kansas City and Mississippi Central railroads, 70 miles north of Gulfport, 90 miles southeast of Jackson. Hattiesburg is the trade centre of a large, fertile agricultural region in which an excellent quality of cotton is extensively cultivated. It is also a large trade centre for yellow yam potatoes and general truck growing. The entire section is experiencing rapid agricultural development and especially along live stock lines. The industries are growing rapidly and the good railroad facilities mean good markets. Located in the very heart of the yellow pine belt, and its chief industrial establishments are sawmills, planing mills, cotton-seed oil mill, cotton compress, foundries, machine shops, boiler works, brickyards, wood reduction plant, railroad shops, ice, electric-light and power plant. The city has three banks, a large number of public buildings, the Mississippi Normal College and the Mississippi Woman's College. Pop. 11,733.

HATTO, hăt'tō, the name of two archbishops of Mainz, both somewhat conspicuous in the history of Germany. The first was chosen archbishop of Mainz in 891, d. 913. The second Hatto (d. 970) was a monk of the monastery of Fulda, and succeeded the celebrated Rabanus Maurus as abbot of the monastery of Saint Boniface about the year 942, and in 968 was raised to the see of Mainz, and continued one of the chief advisers of the emperor. Of his after-life and of his personal character most opposite accounts have been given. By some he is represented as an upright and successful administrator; by others as a selfish and hard-hearted oppressor of the poor; and the strange legend of his being devoured by rats, which Southey has perpetuated in his well-known ballad, is represented as an evidence of the estimate that was popularly formed regarding him. It is quite possible that this legend is of much later date, and that its real origin is to be traced to the equivocal designation of the tower on the Rhine, Mäusethurm, near Bingen, which has been selected as the scene of the occurrence. *Mäusethurm*, «Mouse-tower,» is possibly only a corrupted form of *Mauth Thurm*, «Toll-tower,» a sufficiently descriptive name; but the modified form of the word might readily suggest a legend of mice or rats. The date at which the Mäusethurm was built is unknown, and it is far from certain that it is not much later than the time of Hatto. See Baring-Gould, ‘Curious Myths of the Middle Ages’ (1869); Max Beheim, ‘Die Mäusethurmsage’ (1888).

HATTON, Sir Christopher, English statesman: b. at Holdenby, Northamptonshire, about 1540; d. 1591. Lord chancellor of England, a favorite of Queen Elizabeth; was entered a gentleman commoner at Saint Mary Hall, Oxford, but removed, without taking a degree, to the Inner Temple in 1560. He was introduced at court some time previous to the middle of the year 1564, and it is said Queen Elizabeth was so much struck with his graceful person and dancing that an introduction to her favor was the result, and gained him the name of "the dancing chancellor." He was a furious enemy of the Jesuits, and did not hesitate to accuse Parry, their defender in Parliament, and secure his execution. He was elected a member of Parliament in 1571, became captain of the Queen's Guard in 1572, vice-chamberlain and a privy councillor in 1577, lord chancellor in 1587. He was one of the commissioners for the trial of Mary Queen of Scots, in 1586. His artful speech to the unhappy queen, "If you are innocent you have nothing to fear; but by seeking to avoid a trial you stain your reputation by an everlasting blot," is supposed to have been mainly influential in inducing her to submit to trial. Spenser, whose patron he was, dedicated to him ‘The Faerie Queen.’ Consult the ‘Memoirs’ by Nicolas (1847).

HATTON, Frank, American journalist: b. Cambridge, Ohio, 28 April 1846; d. Washington, D. C., 30 April 1894. He learned the newspaper business with his father, who was editor of the Cadiz (Ohio) *Republican.* He served through the Civil War in the Army of the Cumberland, being commissioned and was subsequently partner with Robert J. Burdette (q.v.) in the proprietorship of the Burlington *Hawkeye.* He was Assistant Postmaster-General (1881–84); Postmaster-General (1884–85), the youngest Cabinet member since Alexander Hamilton; editor of Chicago *Mail* (1884–88); and editor of the Washington *Post* (1888–94).

HATTON, John Liptrot, English composer: b. Liverpool, 12 Oct. 1809; d. Margate, Kent, 20 Sept. 1886. Removing to London in 1832 he became famous for his many operas, cantatas, overtures, entr'actes, etc., and was musical director of the Princess Theatre 1853–59. He is now, however, remembered chiefly for his admirable settings of English songs, of which he wrote 300, such as ‘Good-bye, Sweetheart,’ ‘The Tar's Song,’ ‘The Bait,’ ‘Simon the Cellarer’ and the part song ‘When Evening's Twilight,’ etc.

HATTON, Joseph, English journalist, novelist and playwright: b. Andover, 3 Feb. 1841; d. London, 31 July 1907. Beginning journalism on the Derbyshire *Times,* he went to London, where he edited the *Gentleman's Magazine* (1868–74); and became a newspaper correspondent for the New York *Times* and other journals. Among his numerous novels are ‘Clytie’ (1874); ‘Queen of Bohemia’ (1877); ‘John Needham's Double’ (1885), dramatized for E. S. Willard; ‘By Order of the Czar,’ a novel of Russian life; ‘Princess Mazaroff’; ‘Under the Great Seal’; ‘When Greek Meets Greek,’ a novel of the French Revolution successfully dramatized; ‘When Rogues Fall Out’ (1899). Among his miscellaneous publications the best known are ‘Journalistic London’; ‘Today in America’; ‘The New Ceylon’; ‘Old Lamps and New’; while among his plays may be cited a version of ‘The Scarlet Letter’ successfully acted in the United States; ‘The Prince and the Pauper’; ‘Liz’; and ‘A Daughter of France.’

HAUBERK, hâ'bėrk. The term hauberk generally refers to a coat-of-mail. More broadly, it has been applied to other defensive body armor of coat form; several authorities, including Ashdown, use this term synonymously with the early body defense of leather, usually reinforced with metal studs (mostly called *brigandines*), and copied from the ancient *jazeran.* It has also been used for the *trellised* body defense or the coat with leather scales worn over chain armor, middle of the 13th century. The chain-armor hauberk was used by the Vikings (Norsemen) in the 10th century, but much earlier in the East and in southern Europe. Trajan's Column (44 A.D.) shows some such armor, and the Latin *lorica catenata* (literally coat of chain armor) doubtless refers to this chain hauberk. By the 14th century the plain body cover under the plate armor (see Plate Armor) frequently receives the appellation hauberk.

Fifteenth Century Hauberk.

Originally sleeveless, the chain armor hauberk soon had short sleeves, and, by the time of William Rufus, king of England (1056–1100), the hauberk sleeves reached to the wrists. By the end of the 12th century the hauberk extended over the fingers. A short chain armor body defense was known as *haubergeon.* See Chain Armor.

HAUFF, howf, **Wilhelm,** German historical and satirical novelist and poet: b. Stuttgart, 29 Nov. 1802; d. Stuttgart, 18 Nov. 1827. He began attending the monastery school at Blaubeuren in 1818, later (1820) the seminary at Tübingen, where he pursued studies in theology and philosophy, as he was preparing for the ministry. From 1824 to 1826 he was a tutor in the home of General Baron von Hügel at Stuttgart, traveled in France and Holland in 1826 and became editor of the Stuttgart *Morgenblatt* in 1827, dying the same year. In spite of the small period afforded by his short life for literary work, he was already a well-known writer in his own lifetime, for his activities in the Hügel household seem to have allowed him much leisure, all of which he devoted to literature. His rising prosperity had also led him to enter into what promised to be a very happy marriage, which he was destined, however, to enjoy but eight months. His disposition was that of childish good cheer, harmonious and content, and this is the impression also of his stories and style: easy, flowing; not profound, clear as to action, difficult to understand only when his great carelessness in the construction of sentences gets the upper hand. He produced one long historical novel, ‘Lichtenstein,’ in 1826, which is a distinct application to the Reformation period and to Württemberg, of Sir Walter Scott's methods as used with the various periods of Scottish history and the Scottish country-side. His short stories include ‘Der Mann in Mond’ (satirical romance), ‘Die Bettlerin vom Pont des Arts,’ ‘Jud Süss,’ ‘Das Bild des Kaisers,’ ‘Die letzten Ritter von Marienburg,’ ‘Die Sängerin,’ and a number of fairy-tale accounts, forming a collection included in the framework of ‘Die Karawane’ (‘Kalif Storch,’ ‘Das Gespensterschiff’), and others (‘Zwerg Nase,’ ‘Das steinerne Herz’). Many of these stories deal very satisfactorily with subjects taken from modern life and may be considered in this connection as continuing the similar activity of Tieck (q.v.). ‘Der Mann in Mond’ is now considered to be a satiric romance, in that it is supposed to pursue the purpose of ridiculing the enervated and morally offensive narrations of one of Hauff's contemporaries, H. Clauren, by producing an imitation of the language, the use of epithets and the general cloying sweetness of the latter's literary method. Hauff also produced a number of imaginative satirical sketches, ‘Mitteilungen aus den Memoiren des Satan’; ‘Fantasien im Bremer Ratskeller’; and lyrical poems of real power, ‘Morgenrot, Morgenrot, leuchtest mir zum frühen Tod,’ ‘Steh’ ich in finstrer Mitternacht.’ His works were issued in various editions: ‘Sämtliche Schriften,’ 36 vols. (Stuttgart 1830–31); 10 vols. (Stuttgart 1837, 21st ed., 1891); ed. by Adolf Stern (Berlin 1878); latest collected edition by Bong (Berlin 1908, 6 vols. in 1). See Lichtenstein.

Consult biographies by G. Schwab (Stuttgart 1830) and H. Fischer (Stuttgart 1886); Koch, G., ‘Claurens Einfluss auf Hauff’ (Euphorion, IV, p. 804); Schuster, Max, ‘Der geschichtliche Kern von Hauffs Lichtenstein’ (Stuttgart 1904); Drescher, M., ‘Die Quellen zu Hauffs Lichtenstein’ (Leipzig 1905); Thompson, Garrett W., ‘Wilhelm Hauff's Specific Relation to Walter Scott’ (*Modern Language Publications,* Cambridge, Mass., 1911).

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HAULTAIN, hâ'taīn', Sir **Frederick William Gordon,** Canadian statesman, administrator and jurist: b. Woolwich, England, 25 Nov. 1857. He graduated at Toronto University in 1879, and was called to the bar in Ontario 1882. He was nominated a member of the Northwest Council in 1887, a member of the Advisory Council 1888–95, and premier of the Northwest Territories 1897–1905. He took a conspicuous part in obtaining for the territories full provincial status. He also occupied the post of superintendent of education from 1892–1905. He was appointed chief justice of Saskatchewan in 1912.

HAUPT, howpt, **Herman,** American engineer: b. Philadelphia, Pa., 26 March 1817; d. 14 Dec. 1905. He was graduated at West Point in 1855, but became a civil engineer, and joined the staff engaged on the public works of Pennsylvania. For three years he was professor of civil engineering and mathematics in Pennsylvania College but in 1847 became consulting engineer of the Philadelphia Railroad. He was afterward chief engineer of the Hoosac Tunnel and during the Civil War chief of the United States Bureau of Military Railroads. The Royal Polytechnic Society of Great Britain gave him its highest prize for the drilling machine which he invented, and he first made practicable the transportation and distribution of oil from the well side. He wrote ‘Hints on Bridge Building’ (1840); ‘General Theory of Bridge Construction’ (1852); ‘A Consideration of the Plans Proposed for the Improvement of the Ohio River’ (1855); ‘Military Bridges’ (1864).

HAUPT, Lewis Muhlenberg, American engineer: b. Gettysburg, Pa., 21 March 1844. He was educated at Harvard and West Point. From 1872 to 1892 he was professor of civil engineering in the University of Pennsylvania, and for the year ending 1886 edited the *Engineering Register.* From 1897 to 1902 he was a member of the Nicaraguan and the Isthmian Canal commissions. His published works include ‘Working Drawings and How to Make and Use Them’ (1881); ‘Canals and Their Economic Relation to Transportation’ (1890); ‘A Move for Better Roads’ (1891); ‘The Transportation Crisis’; ‘The Nation and the Waterways’; ‘Mississippi River Problems’; ‘The New York Entrance,’ and many other pamphlets and contributions to engineering. He is the inventor of the «Reaction Breakwater» for creating channels through ocean bars.

HAUPT, Paul, American Assyriologist: b. Gorlitz, Germany, 25 Nov. 1858. He was graduated at the Gymnasium Augustum, Görlitz, in 1876; studied in Leipzig and Berlin, and settled in Göttingen where in 1883 he was appointed extraordinary professor of Assyriology. In the autumn of the same year he accepted the chair of Semitic languages at Johns Hopkins University, Baltimore, Md., but until 1889 continued to lecture part of the year at Göttingen. He projected and continued to edit the so-called Polychrome Bible. (See Bible, Polychrome). Among his many writings in periodical, pamphlet and book form, the most important volumes are ‘Das babylonische Nimrod-Epos’ (1891); ‘Akkadische und sumerische Keilschrifttexte’ (1882); ‘Sumerische Familiengesetze’ (1883); ‘Prolegomena to a Comparative Assyrian Grammar’ (1888); also critical texts with notes of ‘Canticles’ (1902); ‘Koheleth’ (1905); ‘Ecclesiastes’ (1905) ‘Nahum,’ (1907); ‘Esther’ (1908); ‘Micah’ (1910); ‘Biblische Liebeslieder’ (1907); «Die Schlacht von Taanach» in *Studien . . . Wellhausen gewidmet* (1914). He became in 1881 a coeditor of the *Beiträge zur Assyriologie und semitischen Sprachwissenschaft,* published at Leipzig. He was United States delegate to the Oriental Congresses of 1899, 1905, 1908, 1912, and delegate to the International Congress of Americanists at Stuttgart in 1904, and Vienna in 1908.

HAUPTMANN, Gerhart, German dramatist: b. Salzbrunn, Silesia, 15 Nov. 1862. While his family was comparatively well-to-do, they were of lowly origin, and still preserved the tradition of the uprisings of the linen-weavers of Silesia, which had attracted universal attention in the forties of the 19th century, and appear to have been the precursors of the unsuccessful German Revolution of 1848. Gerhart, as well as his two brothers, Karl (q.v.) and Georg, was permeated at an early age with artistic tendencies, which led them to undertake the most varied studies and travels, and prevented them from finding a permanent livelihood until comparatively late in life. A temporary impoverishment of the family led Gerhart to try farming for a time, which he pursued under the direction of a relative at Jauer (Silesia). Here he became acquainted with the sudden wealth of the Silesian peasants who had discovered that their lands held treasures of coal and oil, and with the disastrous and demoralizing effects of such sudden wealth on minds untrained in its intelligent application. Later he took up sculpture (1880–82) at the Art Academy of Breslau, where he learned to know the life and temptations of the artist. A pronounced bias toward sociology and the natural sciences led him to enter the University of Jena as an auditor (he had not the necessary gymnasium training to be matriculated as a regular student), where he absorbed his first radical views through the medium of science, only later to apply them in the realm of poetry. His first work is an epic, Byronic in versification as well as in spirit, embodying the impressions of a long Italian tour in 1883, ‘Promethidenlos’ (The Lot of a Promethean, 1885), full of rebellious and acrimonious arraignment of the injustice of modern society, uttered by Selin (Hauptmann), «who has peered into the terrible abyss of the wretchedness of our time, and perishes through excess of compassion and the overflow of his desire to rescue.» He made few other attempts in verse, outside of the drama, although he did pen some mildly patriotic poems in 1914 and 1915, which he would probably not consider to be among his best productions.

His importance in the literature of Europe is in his dramas. He was not well acquainted with the world's dramatic literature (except Goethe and Schiller, for whom his worship was boundless) before the production of his early works, and it is to this fact that they may owe a certain formlessness, a lack of constructive skill within the acts and an invariably inconclusive termination of the play. But these qualities may also be the result of a dogma learned (1889) from Arno Holz (q.v.), which required that the naturalism of the dramatist should be consistent and complete, «der konsequente Naturalismus.» Hauptmann's first play presents these qualities in form so striking (‘Vor Sonnenaufgang,’ before Sunrise, 1889), that it aroused an immediate artistic battle in German literary circles, of which he remained for a long time the chief subject of dispute. It portrays the depravity of a family of suddenly enriched Silesian peasants, among whom alcoholism and incest are rampant, unrelieved except by the innocence of the heroine (Helene, a member of the stricken family) and the theoretical socialism of the hero, who is also permeated to saturation with doctrines of heredity and moral responsibility. Hauptmann was for a number of years a member of the German Social-Democratic party and an elector («Wahlmann») for the party. In the same year Sudermann (q.v.) had his first play, ‘Die Ehre’ (Honor), performed in Berlin, and although the two men are altogether different in substance and technique, they and the year 1889 are frequently associated in the popular mind as representing the beginnings of the naturalistic movement in German literature. Hauptmann's next play, ‘Die Weber’ (he also wrote an earlier version, entirely in the Silesian dialect, ‘De Waber,’ 1892) is the best known of all his works, and is in many ways illustrative of his purpose and method. It is a presentation of the sufferings and the revolt of the Silesian linen-weaver under a merciless form of capitalistic exploitation, written with a care in naturalistic detail that is reminiscent of Zola (whose influence on Hauptmann is unquestionable), and a preciseness in rendering dialect phonetics that recalls the similar efforts of G. B. Shaw in ‘Captain Brassbound's Conversion’ and ‘Pygmalion.’ A separate *dramatis personæ* is given for each act, although some of the characters run through several acts, in order to convince the reader that there is to be no attempt at individual heroes or at a rounded, satisfying plot. The hero is the mob, the desperate exploited population. In spite of the impersonal nature of the treatment, Hauptmann is not so detached as to conceal his great sympathy for suffering and his desire to present it simply and without adornment. This play has met with great success in foreign countries, especially in America. Like most of Hauptmann's works, it is in prose. ‘Der Biberpelz’ (The Beaver Coat, 1893), a comedy of low life, besides being an excellent indictment of some of the features of an officious Prussian bureaucracy, is by many considered to be the best comedy in German literature since ‘Der zerbrochene Krug’ (1808) of Kleist (q.v.). In 1913 Hauptmann aroused the displeasure of official circles by his unpatriotic treatment of the centenary of the struggle for liberation (1813) in ‘Ein Festspiel in deutschen Reimen,’ which presents a sympathetic picture of the great Napoleon, and a less sympathetic treatment of Blücher and others. Hauptmann's years of activity are associated chiefly with Berlin and its suburbs, where the Hauptmann controversy is still an important literary conflict; but his extensive travels brought him into contact with other civilizations. The literary product of a trip to the United States of America is the novel ‘Atlantis’ (1912), while ‘Griechischen Frühling’ (Springtime in Greece, 1908) is a beautiful rendering of his impressions of Mediterranean travel. In 1912 he received the Nobel Prize (q.v.) for literature. English translations of all his plays and novels are obtainable. ‘Dramas’ (7 vols., trans. by L. Lewisohn; New York 1912–18); individual novels, no collected edition, by same publisher (Huebsch, N. Y.). Names and dates of originals: Plays.— ‘Das Friedensfest’ (1890); ‘Einsame Menschen’ (1891); ‘Kollege Crampton’ (1892); ‘Hanneles Himmelfahrt’ (1893); ‘Die versunkene Glocke,’ ‘Florian Geyer,’ ‘Elga,’ ‘Helios’ (1896); ‘Das Hirtenlied,’ ‘Fuhrmann Henschel’ (1898); ‘Michael Kramer’ (1900); ‘Der arme Heinrich’ (1902); ‘Rose Bernd’ (1903); ‘Und Pippa tanzt’ (1906); ‘Kaiser Karls Geisel’ (1908); ‘Griselda’ (1909); ‘Die Ratten’ (1911); ‘Gabriel Schillings Flucht’ (1912). Novels and short stories —‘Bahnwärter Thiel’ (1887); ‘Der Apostel’ (1890); ‘Der Narr in Christo’ (Emanuel Quint, 1910). Consult Schlenther, P., ‘Gerhart Hauptmanns Leben und Werke’ (Berlin 1913); Bartels, A., ‘Gerhart Hauptmann’ (Berlin 1906); Stoeckius, A., ‘Naturalism in the Recent German Drama’ (New York 1903); Benois-Hanappier, L., ‘Le drame naturaliste en Allemagne’ (Paris 1903); Sulger-Gebing, E., ‘Gerhart Hauptmann’ (Leipzig 1909); Röhr, J., ‘Gerhart Hauptmanns dramatisches Schaffen’ (Dresden 1912). See HANNELES HIMMELFAHRT.

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HAUPTMANN, howpt'mạn, **Karl**, German novelist, elder brother of Gerhart Hauptmann (q.v.): b. Ober-Salzbrunn, Silesia, 11 May 1858. His father was Robert Hauptmann, the proprietor of a large hotel. Carl's training was more in the domain of the natural sciences than that of his brother Gerhart, but this has not prevented him from developing a very keen poetic observation, especially in the rendering of the atmosphere of an environment, the *milieu* of a story. He attended the University of Jena (1879–83), where he pursued chiefly the study of biology, Ernst Haeckel being one of his teachers, and the University of Zürich, where his attention (1884–89) began to turn more toward psychology and the abnormal, under Richard Avenarius and A. Forel. He moved to Berlin in 1889, later to Schreiberhau (1891), visited the United States as lecturer for the Germanistic Society of America in 1909, where he delivered lectures and readings from his own works. His plays occasionally display a fine psychology and a faithful presentation of mood and atmosphere, but have not been as successful as his novels; he is not to be compared as an artist with his brother Gerhart, however, who is immeasurably his superior. Karl's works include ‘Ephraims Breite’ (1899); ‘Die Bergschmiede’ (1901); ‘Mathilde’ (1902); ‘Einhart der Lächler’ (1907); and many others. Consult Borcherdt, H. H., ‘Karl Hauptmann, Er und über ihn’ (Munich 1911).

HAUPTMANN, Moritz, German musician: b. Dresden, 13 Oct. 1792; d. Leipzig, 3 Jan. 1868. He studied at Gotha; was violinist at the court in Dresden in 1812; in 1815–20 was employed as music teacher in the family of a Russian prince; in 1842 he was appointed cantor of the Thomasschule in Leipzig, and the next year became professor of counterpoint at the Leipzig conservatory, where he was very successful and popular as a teacher, and was regarded as the chief theorist of his day. His compositions include motettes, an offertory, and sonatas for violin and piano, and the opera ‘Mathilde’ (1826). In 1853 he published his ‘Die Natur der Harmonik und Metrik,’ a very important theoretical work.

HAURAN, how'rạn, a volcanic district of Syria, corresponding to the ancient Auranitis. It lies south of Damascus, and east of the upper Jordan, between lat. 32° 30' and 33° N. The boundaries have been variously interpreted. The part called Hauran proper consists of an elevated plateau and fertile plains in one part and a barren lava plateau in the other. The mountain of Jebel-Hauran, rising to about 6,000 feet, flanks it on the east. There are railway connections with Damascus. Expeditions from Princeton University (1899, 1904 and 1909) have succeeded in uncovering interesting remains, among which is the Job stone at Sheikh Saad, erected by Rameses II (1310–1244 B.C.). Excavations show several layers of civilization. Some 300 deserted towns in Hauran contain remarkably preserved stone houses. Consult ‘Publications of an American Archæological Expedition to Syria, 1899–1900’ (Leyden 1904–08), and ‘Princeton University Publications of Archæological Expeditions to Syria, 1904–05 and 1909’ (Leyden 1908–13).

HAUSA (how'sä) **LAND**, Africa, a former important negro kingdom, north of the junction of the Benue and Niger rivers. After internecine divisions it was succeeded by a Mohammedan Fulah empire in 1802, and since 1 Jan. 1900 is incorporated in Nigeria. The name is perpetuated by a negritic race and language distributed far beyond the ancient Hausa boundaries. The race is distinguished as able traders and craftsmen, and the language, for its euphony, simplicity and literary adaptability. A professorship of the language was established at Cambridge University and a society was formed in London in 1892 for its study. Consult Robinson, C. H., ‘Hausaland: Fifteen Hundred Miles through the Central Soudan’ (London 1896).

HAUSMANNITE, hous'mạn-īt, popularly known as black manganese, a native Trimanganic tetroxide, having the formula $MnO.Mn_3O_4$, and crystallizing in the tetragonal system, generally twins and often fivelings, with octahedral habit. It is brownish black in color, and opaque with a submetallic lustre. It has a hardness of from 5 to 5.5, and a specific gravity of from 4.72 to 4.86. Hausmannite dissolves in hot hydrochloric acid, with evolution of chlorine gas. It occurs in Germany, Sweden, Alsace and elsewhere, usually as fine crystals in connection with porphyry. It has been obtained artificially by keeping fused manganese chloride for several hours in an oxidizing atmosphere saturated with water vapor, and in some other ways. It was named in honor of the German metallurgist, J. F. L. Hausmann.

HAUSSMANN, Georges Eugène, zhŏrzh ė-zhān ōs-mān, BARON, French municipal officer: b. Paris, 27 March 1809; d. there, 11 Jan. 1891. He studied law, and under Louis Philippe was sous-prefect of various places. The February Revolution of 1848 caused the forfeiture of his office, but Louis Napoleon in 1853 made him prefect of the Seine, and he applied himself to the improvement and adornment of Paris with such energy that the city became transformed under his administration. He became senator in 1857. His memoirs were published 1890–93.

HAUTBOY, hō'boi (French *hautbois*, "high wood," alluding to its tone); a wooden wind-instrument of two-foot tone, played with a double reed. Also an organ stop, consisting of reed pipes slightly conical, and surmounted by a bell and cap of eight feet pitch. The tone is thin and soft.

HAUTEFEUILLE, ōte'fė'y', **Paul Gabriel**, French mineralogist and chemist: b. Etampes 1836; d. Paris 1902. He was director of the chemical laboratory and teacher of metallurgy at the place of his birth until 1885, when he was called to the chair of mineralogy in the University of Paris. He has written extensively in periodicals and reviews on scientific subjects and is recognized as an authority on the subjects he has been teaching.

HAÜY, René Just, ré-nā zhüst ä-ü-ē or ā-wē, French mineralogist: b. Saint Just, Oise, 28 Feb. 1743; d. 3 June 1822. He was trained for the Church and took priest's orders, but turned to mineralogy, and acquired a great reputation by a series of important discoveries. Among the chief of these is the geometrical law of crystallization, according to which a given mineral uniformly contains the same primary form as its basis of crystallization. From that time, according to Herschel, mineralogy first ceased to be "a mere laborious cataloguing of stones and rubbish." In 1794 Haüy became keeper of the cabinet of the School of Mines, and in 1802 professor of mineralogy in the Museum of Natural History. His works include 'Traité de Mineralogie' (1801), and 'Traité de Crystallographie' (1822).

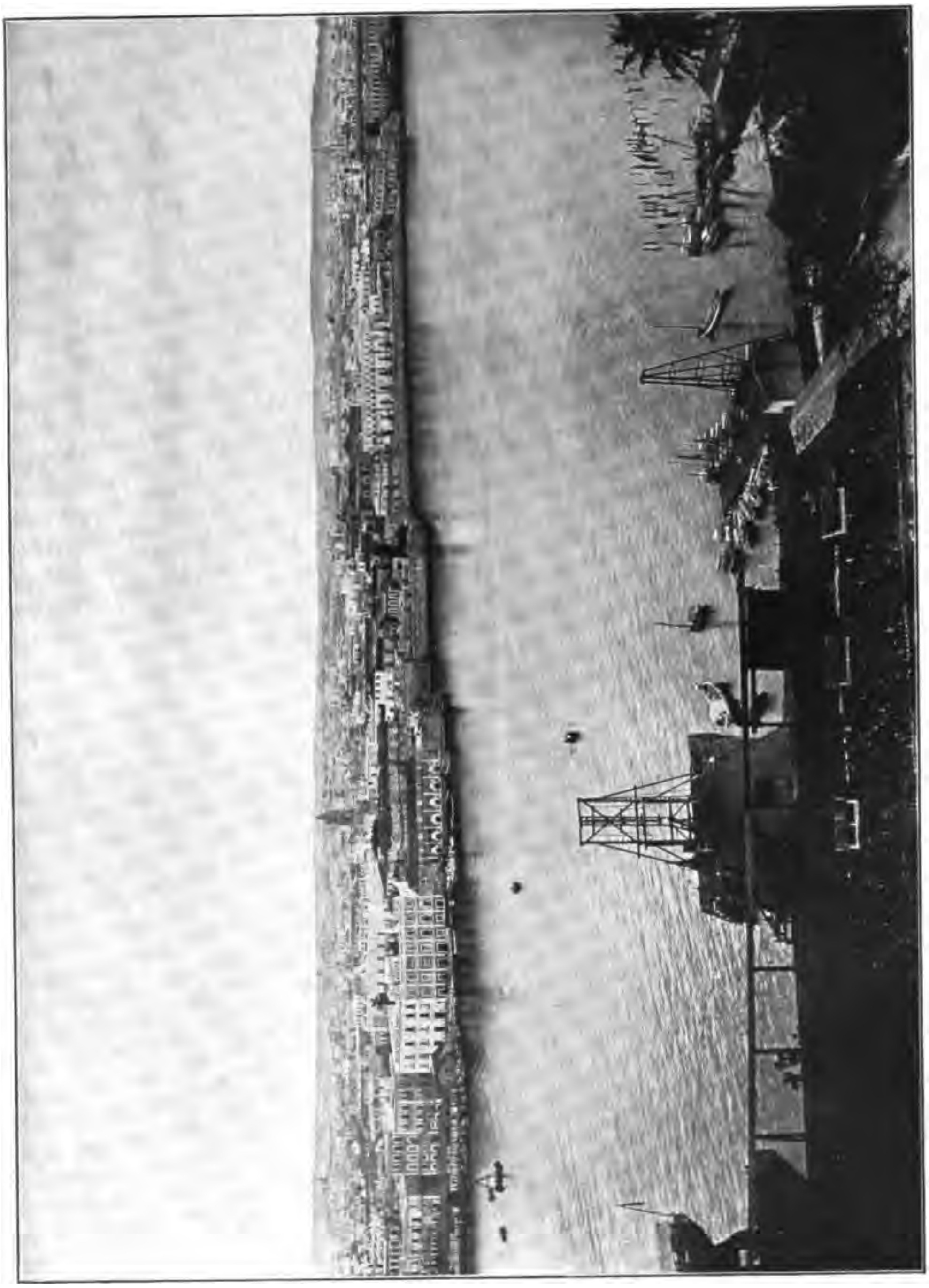
HAÜYNITE, hā'wĭn-īt, or **HAÜYNE**, hä'wĭn, a mineral of the sodalite group, occurring in certain igneous rocks, and notably in the lavas of Mount Vesuvius. It is a silicate and sulphate of sodium, calcium and aluminum, crystallizing in the isometric system. It is usually translucent with a vitreous lustre, a hardness of from 5.5 to 6 and a specific gravity of about 2.45. Häuynite is commonly blue or green, though red and yellow specimens are also known. It was named in honor of the French mineralogist, R. J. Haüy (1742–1822).

HAVANA (Sp. La Habana, lä hä-bä'nā), Cuba, its capital and the commercial centre of the West Indies. It occupies nine square miles on the west side of the Bay of Havana on the north coast, one of the noblest harbors in the world, with deep water up to the quays; entered by a narrow channel three-eighths of a mile long, protected by Punta Castle on the west and Morro Castle and La Cabaña on the east. It is in two sharply distinct sections. The old city, the commercial quarter, was built on the small western peninsula dividing the sea from the harbor, a low plain cut by a small stream on the west, strengthened by a city wall only torn down a generation ago. It is largely, and was entirely till the American occupation, a maze of narrow, crooked lanes traversed by one or two broader streets; the chief of which are the Calle O'Reilly, the main business street, running from the governor's palace to the city wall, and the Calle Obispo (Bishop street). The new city is on a ring of hills 150 feet high south and west of the old, with the castle of El Principe on the crest, and has a wealth of broad and finely shaded macadamized streets, drives, promenades, parks, plazas, flower-gardens, fountains, statues, etc., which make it one of the handsomest cities in the world. There is no "West End" in Havana, the houses of the wealthy being scattered through every part, usually of classic pattern, with an inner courtyard or patio surrounded by marble or stucco columns, containing a garden of tropical vegetation and a central fountain. The handsomest residence street, next to the new suburb Vedado, is the Cerro, a long thoroughfare running up a hill at the farther end, and bordered by immense old villas in the midst of splendid gardens. The finest drives and promenades are the Malecon, a new thoroughfare along the water-front from Prado to the Vedado, the Prado, a boulevard with a double row of shade-trees in the middle, running from Punta Castle outside the old wall, and ending in the largest park in the city, Colón Park or Campo Marte, and the Calle de la Reina (Queen street) starting west from this park and continued as the Paseo de Tacon to the citadel of El Principe. The Alameda de Paula along the bay is also a favorite promenade.

Among buildings, the most interesting are the palace of the old captains-general, facing the Plaza de Armas near the harbor front, the cathedral, built 1764, and supposed to contain the ashes of Columbus in an urn till it was removed to Spain in 1898 (but the San Domingans claim they have his authentic bones), and the Tacón Theatre, perhaps the largest in the world. There are several other theatres and opera-houses, and many clubs, etc. The chief educational institutions are the University of Havana, founded 1670 by the Dominicans; the Jesuit boys' college de Belén, with a museum, observatory, a library rich in old Cuban history, etc.; College of American Augustinian Fathers, founded 1901. Famous among benevolent institutions are the Casa de Beneficencia, founded by Las Casas for infants. There are three general hospitals, a great lazaretto for lepers and an insane hospital in the city and vicinity. Over 100 newspapers, etc., are published in the city.

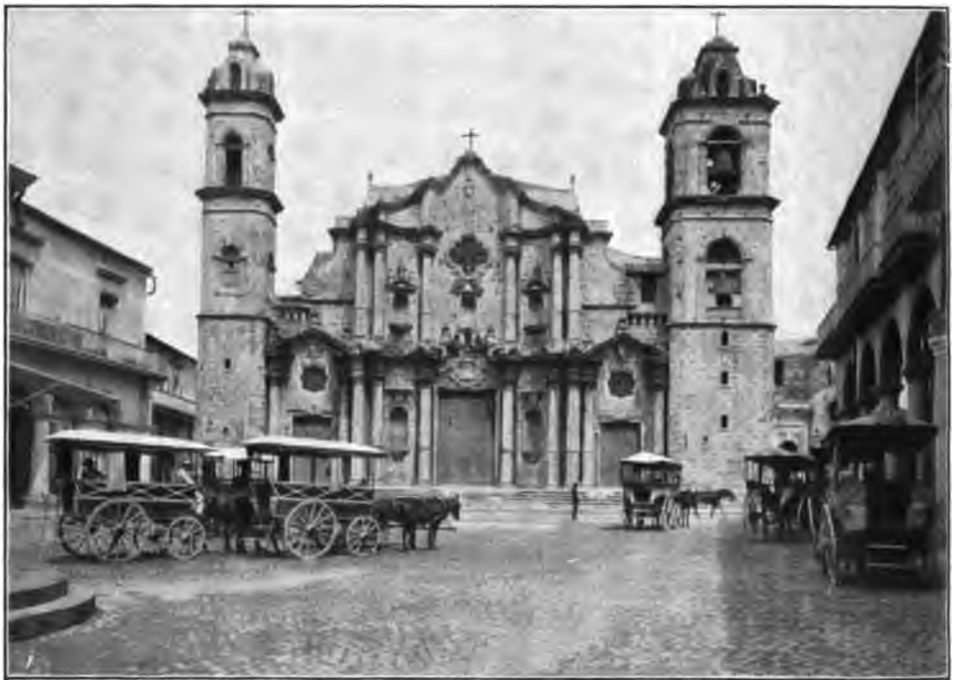
The water supply of the city was installed by a Cuban engineer, Albear, some 40 years ago, and is considered a remarkable specimen of good workmanship. It comes from the Vento by an aqueduct 12 miles long, known as the Canal of Albear. In all other respects the Americans at the conquest found an undescribable state of filth and disease. The city was the prey of yellow fever; the sewers had seldom been cleaned since they were laid down, and some of them were choked with generations of rottenness; the buildings were pest-holes; and in that dungeon of horrors, the military hospital, 70 per cent of the inmates died. The United States forces in their short stay transformed this reeking home of pestilence into one of the healthiest cities in America. In systematic order streets were cleaned, repaved, widened; squads of cleaners were sent from house to house, emptying the Augean stables under them, whitewashing and disinfecting them, and where they were shanties that were nests of infection, tearing them down; the hospital was cleaned,

HAVANA



View of Havana from Cabanas

HAVANA



1 Cathedral of Havana

2 Colon Park, Havana

disinfected and covered deep with whitewash, and turned into a schoolhouse. New business streets were made by widening old lanes; parks were cleared up, and a fine sea-wall along the ocean to the north was built. The average deaths from yellow fever 1887–98 were 440; in 1896 they were 1,262; in 1901, for the first time in its history, only three or four. A Cuban physician of Irish descent, Dr. Carlos Finlay, now chief sanitary officer of Havana, was the originator of the mosquito theory of the yellow fever. General Wood and the American army surgeons, however, deserve much credit for making the theory of practical use.

The climate is not severe. The mean annual temperature is 77°; the range from hottest to coldest 82° to 71°; the highest record, 100.6°, the lowest 49.6°. The mean rainfall is 54 inches.

Havana is the market of western Cuba, the head of the island's banking and commercial interests and the emporium of the West Indies. Besides being the centre of the island railway system and of a great domestic shipping trade, especially with Santiago, it is the focus of a vast foreign commerce with Spain, France, England and the United States, regular ocean lines running weekly to the first three and semi-weekly to the latter, besides others to the other West Indies. It has excellent covered wharves and a capacious dry-dock to aid this. Regla, on the opposite side of the bay, contains the sugar wharves and railway termini. For an analysis of foreign trade and figures showing its increase in volume and the changes in distribution of exports and imports, see the article CUBA. Havana's exports are chiefly of sugar, tobacco, cigars and cigarettes; the imports, flour, rice, lard and other foods, cotton and metals. Its manufactures are mainly tobacco products; its cigar factories, of which there are over 100 of the first rank, are the largest in the world, one covering an entire square. It also manufactures confectionery, perfumes, rum, etc. The new electric street railway system is one of the finest of its kind, with 36 miles of track.

History.—Havana was founded here (transferred from an older site) by Diego de Velasquez in 1519, and called by him «the key of the New World.» Burned by buccaneers, in 1528, it was rebuilt and made the chief naval station of Spain in this hemisphere, twice sacked in 1555 and 1563, it was a storm centre of wars and piracies for two centuries. In 1762 the English captured it, but restored it to Spain the next year. In 1802 it was partly burned, but under Governor Tacón it was rebuilt from a straw-thatched wooden town to a city of brick and stone. For its late history, see CUBA. Pop. 350,000.

HAVANA, Ill., city, county-seat of Mason County, on the Illinois River and on the Chicago, Peoria and Saint Louis and the Illinois Central railroads, about 39 miles northwest of Springfield. It has some reputation as a summer resort. It is situated in an agricultural region and is the trade centre for a large extent of country. The chief manufactures are flour, agricultural implements, drills, gasoline engines, cutlery, cooperage and some factory supplies. Its trade is chiefly in grain, fruit, vegetables and dairy products. The waterworks are owned and operated by the city. Pop. 3,525.

HAVAS (ạ'vạ) **AGENCY,** the strongest and best known of the French news agencies. It had its origin in a translation bureau established in Paris in 1835 by Charles Havas, for the turning into French of interesting news from the English and Continental papers, as a news service for Parisian and other French publications. See PRESS ASSOCIATIONS; HAVAS, CHARLES.

HAVELOCK, hăv'ē-lŏk, SIR **Henry,** English soldier: b. Bishop-Wearmouth, near Sunderland, 5 April 1795; d. Dilkusha, India, 24 Nov. 1857. Entering the army, he served with distinction in the Burmese War (1824–26); in 1829 married, became a Baptist and was distinguished during the remainder of his life by his earnest religious zeal. He participated in the Afghan War and in the defeat of Mohammed Akbar, 1843. He took part in the Mahratta War and distinguished himself in the Sikh War of 1845. He commanded a division in the Persian War (1856–57) and on the outbreak of the Indian mutiny was dispatched to Allahabad in order to support Sir H. Lawrence at Lucknow and Sir H. Wheeler at Cawnpore. On arriving at Cawnpore he found that Nana Sahib had massacred the prisoners. Pursuing his march to Lucknow, he defeated the rebels at Bithoor and finally won the battle of Alumbagh. Having captured Lucknow, Havelock and Outram were shut up there until relieved by Sir Colin Campbell, 17 Nov. 1857. He was raised to the rank of major-general, made a K. C. B. and (before his death was known) created a baronet. Consult lives by Brock (1858); Marshman (1890); Forbes (1890).

HAVEMEYER, hăv-ē-mī'ėr, **William Frederick,** American banker: b. 31 March 1850. He received his education in private schools and entered into commercial business, and as a successful financier became vice-president and director of the National Bank of North America and of the Queens County Bank of Long Island, and took a place in the board of directors of numerous railroad and banking corporations.

HAVEN, Alice Bradley, American author: b. Hudson, N. Y., 1828; d. 1863. Her maiden name was Emily Bradley, and while a school girl she sent under the pseudonym of «ALICE G. LEE» many sketches to the *Saturday Gazette,* then recently established by Joseph C. Neal in Philadelphia. She was married to Mr. Neal in 1846, and at his request assumed and retained the name of Alice. On the death of her husband in 1847 she conducted the *Gazette* for several years. She published in 1850 'Gossips of Rivertown, with Sketches in Prose and Verse,' and became widely known by her series of juvenile stories, as 'Helen Morton,' 'Pictures from the Bible,' 'No such Word as Fail,' 'Patient Waiting no Loss,' 'Contentment Better than Wealth,' 'All's not Gold that Glitters,' 'Out of Debt Out of Danger,' etc. In 1853 she was married to Samuel L. Haven.

HAVEN, Erastus Otis, American Methodist bishop and educator: b. Boston, Mass., 1 Nov. 1820; d. Salem, Ore., 3 Aug. 1881. He was graduated at the Wesleyan University, Middletown, Conn., in 1842, soon after entered the ministry of the Methodist Episcopal Church, was appointed teacher of natural science in the

Amenia Seminary, N. Y., and in 1845 was elected principal of that institution. He was professor of Latin and Greek in the University of Michigan 1854–56; editor of *Zion's Herald* 1856–63 and sat in the Massachusetts senate 1862–63. He was president of the University of Michigan 1863–69 and of Northwestern University, Evanston, Ill., 1869–72. He was chancellor of Syracuse University (1874–80) and was elected bishop in 1880. He published 'The Young Man Advised' (1855); 'Pillars of Truth' (1866); 'Rhetoric' (1869). His autobiography, edited by Stratton, appeared in 1883.

HAVEN, Gilbert, American Methodist bishop: b. Malden, Mass., 19 Sept. 1821; d. there, 30 Jan. 1880. He was an able writer and a forceful preacher. In the Civil War he was the first commissioned chaplain in the Federal army. He was editor of *Zion's Herald* 1867–72 and was elected bishop in the latter year. He published 'The Pilgrim's Wallet, or Sketches of Travel in England, France and Germany' (1865); 'National Sermons' (1869); 'Life of Father Taylor, the Sailor Preacher' (1871); 'Our Next-Door Neighbor, or a Winter in Mexico' (1875), etc. Consult the 'Life,' by Prentice (1883), and the 'Memorials,' edited by Daniels (1880).

HAVERFORD COLLEGE, Haverford, Pa., under the auspices of the Society of Friends, was founded in 1833. It was first known as Haverford School, but in 1845 it was suspended for the purpose of collecting an endowment, and in 1856 it was made a college. It was the first collegiate institute in the United States which was founded and conducted entirely within the Society of Friends. Others besides the sons of Friends were admitted as pupils after 1849. It is well equipped in laboratory requirements and in its library facilities. The degrees of B.A., B.S. and M.A. are conferred. It offers 67 scholarships of a total annual value of $14,600, including four competitive Corporation scholarships in every class, valued at $300 each. Four Rhodes scholarships have been held at Oxford, England. The faculty membership is 25; the student registration annually is from 170 to 200. The college grounds cover 226 acres, the campus 70 acres, and with the 17 college buildings exceed in value $2,000,000. The productive endowment funds aggregate $2,577,574.

HAVERGAL, hăv′ėr-gạl, **Frances Ridley,** English hymn-writer: b. Astley, Worcestershire, 14 Dec. 1836; d. Swansea, Wales, 3 June 1879. She was a frequent contributor to *Good Words* and the chief English religious periodicals, and her musical harmonies were praised by the German composer Hiller. Her poems and hymns were collected in several volumes, 'The Ministry of Song' (1870) being the first. Her 'Poetical Works' (1884) appeared under the editorship of M. V. G. Havergal. Of her hymns, which contain her best work and are found in all collections, the most familiar is 'Take My Life and Let It Be.' The 'Memoir,' by her sister (2d ed., 1880), exercised a wide influence in evangelical circles.

HAVERHILL, hā′vėr-ĭl, Mass., city in Essex County, on the Merrimac River at the head of navigation, and on the Boston and Maine Railroad, about 30 miles from Boston. It is an important centre of street railway traffic, electric lines radiating from it connecting it with all of the important cities and towns of northeastern Massachusetts and southeastern New Hampshire. Four highway bridges span the river, connecting the city respectively with the Bradford district, with Groveland and with West Newbury. Haverhill, including Bradford, which was annexed to it 4 Jan. 1897, is 9 miles long and 7½ miles wide, and covers an area of 32 square miles. Bounding the entire southern length of the original city and separating it from its adjunct, Bradford, from Groveland and from West Newbury, flows the Merrimac River, navigable from the sea to the very heart of the city, and affording for freightage or pleasuring a delightful waterway. From the river on both sides the land slopes upward, the lower parts near the river being occupied for manufacturing and commercial purposes, the higher lands for residences. Five large lakes — Kenoza, Round Pond, Saltonstall, Crystal and Chadwick's Pond — lie entirely within the limits of the city, and with a large artificial lake at Mill Vale, afford an abundant supply of water for all purposes. The eastern and western parts of the city are known as East Haverhill and West Haverhill, their more thickly settled parts being respectively Rocks Village and Ayres Village; the southern portion, in the Bradford district, is known as Ward Hill.

Government.— Haverhill was the first city in the East to adopt the commission form of government. The administrative heads of the city are a mayor and four commissioners elected at large regardless of ward lines. The mayor receives $2,500 a year; the aldermen $1,800 a year; each is elected for a two-year term. Each alderman is at the head of a specific department and is responsible for what goes on in his department. The school board consists of four members, elected for two-year terms without regard to politics or ward lines. The administrative officer of the board is the superintendent of schools. The water board consists of five members, each appointed by the city government for a term of five years; the park commission consists of five members, each appointed by the city government for a term of five years; the trustees of the public library, six in number, and the trustees of the Hale Hospital, five in number, hold office for life, vacancies being filled by the boards of trustees.

Financial.— The assessed valuation of the city, 1 April 1918, was $47,649,919. The tax levy for 1918 was $1,038,768.23; State tax, $105,600; county tax, $74,868.97; net bonded debt, 31 Dec. 1917, $1,481,711.37; municipal loans, $1,182,823.95; water loans, $298,887.42.

Manufactures.— According to the latest available figures for the year 1913, taken by the State Bureau of Statistics, Haverhill has 316 manufacturing establishments with an aggregate capital of $17,582,966. The average number of wage-earners employed is 13,697 and they receive $8,809,239 in wages. There are 116 shoe manufacturing establishments with an aggregate capital of $9,467,208 and the value of the shoes produced is $27,508,440. The Board of Trade estimates that approximately 22,000,000 pairs of shoes were made in Haverhill in 1914. There are 115 concerns in the boot and shoe cut stock and finding trade; their aggregate capital is $4,014,039 and the value of their products $9,583,640. The Board of Trade estimates that in 1916 about 17,000 people were employed in wage-earning industries in Haverhill, 13,000 of these in the shoe manufacturing industries in which they received an average wage of $673 a year. Haverhill has built an average of one modern factory a year since 1903, when the Board of Trade erected a factory containing 75,000 square feet of floor space. Other important industries in Haverhill are the manufacture of hats, woolen goods, box board, wooden and paper boxes, tacks, nails and machinery.

Schools.— Haverhill has 34 public school buildings with 242 teachers and 7,350 pupils. The aggregate value of the school buildings is $1,062,200. There is a splendid high school building which cost $400,000 and accommodates 1,000 pupils.

Board of Trade.— There are 700 members in the Board of Trade, which has been organized for 25 years and has been an active factor in Haverhill's growth. It blazed the way for the modern factory building era; collected $10,000 for a modern lighting system in the down-town streets; has brought many industries to Haverhill; has been active in the suppression of canvassers, and in the development of retail trade. The board has also inaugurated through package-car service for local manufacturers to all the important jobbing and mercantile centres.

Parks.— There are 27 public parks in the city. Winnikenni Park, adjacent to Lake Kenoza, is very extensive, diversified and beautiful, and abounds in delightful drives.

Public Buildings, Institutions, etc.— The Public Library was founded in 1875 by the generosity of E. J. M. Hale, whose gifts to it, including a legacy of $100,000, amounted to more than $175,000. The library contains over 100,000 volumes, with an annual circulation of nearly 160,000. There are four branch libraries for the accommodation of the more remote parts of the city, and 12 loan libraries placed in the district schools. Loan libraries are also established in connection with each grammar school, books being sent to and from these schools each week. The Hale Hospital occupies a set of buildings of the most modern type and equipment. The Gale City Hospital, opened in February 1916 with accommodations for 50 patients, was formerly The Children's Home and was presented to the city for use as a hospital by Gen. Stephen Henry Gale. Haverhill also has a tuberculosis hospital and a separate contagious isolation hospital. The Historical Society occupies the «Buttonwoods,» a large old mansion house on Water street, formerly the seat of the Saltonstall family, marking very closely the site of the first settlement of Haverhill. The Whittier homestead, the birthplace of the poet, John Greenleaf Whittier (17 Dec. 1807) and the scene of his poem 'Snowbound,' is situated about three miles from the heart of the city on the Merrimac road. The house, with the grounds surrounding it, is owned by the Whittier Association, and it is visited annually by many pilgrims. The Y. M. C. A. and Y. W. C. A. have complete and well-equipped buildings, including a thoroughly equipped gymnasium. The Pentucket Club occupies an elegant mansion, formerly the Duncan residence, nearly a century old, designed by the celebrated architect, Haviland, but harmoniously enlarged to meet the needs of the social club now occupying it. Haverhill lodge of Elks own a magnificent $87,000 home; the Moose have a lodge home and Division 14, A. O. H., owns its own building. The local military organization is Company F, of Eighth regiment, M. V. M., organized in 1869, and attached to the Second brigade. Among the numerous fraternal and other organizations may be mentioned seven Masonic bodies, maintaining a Freemason's Hall Association, with a capital of $50,000; eight lodges of Odd Fellows, maintaining an Odd Fellows' Hall Association, with a capital of $100,000; Elks, Foresters, G. A. R., Sons of Veterans, Woman's Relief Corps, Red Men, Daughters of Pocahontas, Knights of Malta, American Workmen, Knights of Pythias, Patrons of Husbandry, Royal Arcanum, Moose, Eagles, Knights of Columbus, Catholic Order of Foresters, Boot and Shoe Workers' Union, Shoe Workers' Protective Union, etc., while two literary clubs, the Monday Evening Club and the Fortnightly Club, are noteworthy.

History.— The first settlement of Haverhill was made in 1640–41 by men from Newbury and Ipswich, the new settlement being known as Pentucket. In the year 1641 the Rev. John Ward came from Ipswich to be the minister and leader of the colonists, and so pleased were they with his character, attainments and zeal that they named the place Haverhill from the older Haverhill in England, which was his birthplace. In 1642 title to the tract of land, 14 miles in length, was obtained by purchase and deed from the Indians, Passaquo and Saggahew. In 1660 the first public school was established, its teacher, Thomas Wasse, his salary £10 a year. For many years Haverhill was a frontier town, and suffered from the forays of the Indians. On 15 March 1697 the savages attacked the house of Thomas Duston, carrying away his wife, Hannah, her infant child and her nurse, Mary Neff. The child was soon killed, but Mrs. Duston, taken to an island in the Merrimac River above Concord, N. H., in the night, with the assistance of her nurse and a captive youth, killed the Indians who were guarding her, as they lay asleep, scalped them, and escaped in a canoe, carrying the scalps as proof of her deed. A monument to her in City Hall Park commemorates her heroism. On 29 Aug. 1708 the Indians made a murderous foray upon the centre of the town, setting fire to the church and the houses, killing the Rev. Benjamin Rolfe and 15 others, carrying away about 20 captives, but leaving about 30 of their own number dead. These are the more notable among many Indian attacks upon the place. At the outbreak of the Revolution Haverhill contributed to the patriot cause her quota of men, 74 of her sons being engaged in the battle of Bunker Hill. On 4 Nov. 1789 George Washington visited the town, remaining over night at Harrod's tavern, on the site where the city hall now is, and paying delightful compliments to the town and its beautiful location. In 1793 a stage coach line was established between Boston and Haverhill, «fare, 3d. a mile,» running twice a week. On 6 Sept. 1793 the first newspaper printed in the town was published. It was called *The Guardian of Freedom,* and was issued weekly at nine shillings a year. In 1794 the first bridge across the river was erected. In 1827 the Haverhill Academy was opened, one of the students, John G. Whittier (q.v.), writing an ode for the dedication. In 1828 the Rocks Bridge was completed, and in the same year the steamer *Merrimac,* the first on the river, began running between Haverhill and Newburyport. In 1837 the railroad, now the Boston and Maine, was extended from Andover to Haverhill. In 1842 certain citizens of Haverhill presented to Congress, through John Quincy Adams (q.v.), the famous petition for the dissolution of the Union, the object being to rebuke the Congressional agitators. In the Civil War Haverhill contributed to the Union cause about 1,300 men, her first troops leaving for the front on the day when the Massachusetts Sixth was attacked in Baltimore. To those who fell in that war she erected in 1869 on one of her principal squares a beautiful soldiers' monument. Haverhill became a city in 1869. The old place has suffered from several disastrous fires, one in 1775 which destroyed 17 buildings in the little town; one in 1873, which burned out 35 business houses, and the most disastrous one of 17 Feb. 1882, which burnt out about 300 business firms and destroyed about $2,000,000 worth of property. On 6 Nov. 1888 the city hall, built in 1861, was gutted by fire, but it was immediately rebuilt.

The shoe and leather industry of Haverhill dates back almost to the time of the first settlement, for in 1643 Job Clement established a tannery, and at about the same time Andrew Greeley practised the trade of shoemaker for the little settlement. In 1818 a special two-horse wagon was regularly run between Haverhill and Boston for the transportation of shoes, and in 1835 the traffic employed 40 horses and two yoke of oxen. The coming of the railroad to Haverhill in 1837 furnished a better means of transportation and gave new impetus to manufacturing. In 1850 about 50,000 cases of shoes were sent out; in 1860 about 94,000, valued at about $3,750,000. The change in 1870 from town government to city government was coincident with an awakening to new life. Old residential streets were changed to manufacturing centres, old farms and pastures became thickly covered with residences, and in manufacturing the city rapidly grew to be one of the three cities leading in the output of shoes. To-day fully 10 per cent of the total output of shoes in the United States and nearly one-fourth of the total number produced in Massachusetts is made in the Haverhill factories. In 1890 Haverhill celebrated the 250th anniversary of its settlement amid a great gathering of distinguished sons and guests, the address being by the Rev. Samuel H. Duncan, the historical poem by Dr. John Crowell, and the beloved and distinguished son of the town, the poet Whittier, sending as a tribute his beautiful poem, «Haverhill.» In 1915 Haverhill appropriately commemorated her 275th anniversary.

Population.— The population of Haverhill (United States census of 1900) was 37,175, an increase from 27,412 in 1890. A part of this increase was due to the annexation of Bradford, the population of which in 1895 was 4,736. The State census of 1915 gave Haverhill a population of 49,450.

Albert L. Bartlett.

HAVERHILL, N. H., village, county-seat of Grafton County, on the Connecticut River and on the Boston and Maine Railroad, about 90 miles northwest of Concord. The town contains several villages, the largest of which is Haverhill. The surrounding region is largely devoted to agriculture, but the granite quarries in the vicinity add to the industrial wealth of the village. Some of the manufactures are flour, lumber, house furnishings, stanchions, wagons, furniture, whetstones made from the stone found nearby and dairy products. The public buildings include the county building, almshouse, hospital and high school. Haverhill was first settled in 1762. Pop. 3,498. Consult Bittinger, J. A., ‹History of Haverhill› (Albany 1888).

HAVERS, Clopton, English anatomist and physician: b. 1650; d. 1702. After study at Cambridge he proceeded to Utrecht, where he graduated M.D. in 1685. He established himself as a practising physician in London, and acquired a reputation by his profound studies on bone structure, which are exhaustively summarized in his ‹Osteologia Nova› (1691). His name is perpetuated in osteology by the technical term «Haversian canals.» Among his other works are ‹Researches on the Lachrymal Gland› (1691); ‹Survey of the Microcosm› (1695), and ‹Discourse on the Concoction of Food› (1699).

HAVERSCHMIDT, hä'vėr-shmĭt, **Francis,** Dutch poet: b. Leeuwardien 1835; d. Schiedam 1894. Educated for the Church, he completed his studies at Leyden. He became known as «Piet Paaltjens,» the pseudonym under which he published ‹Snikken en Grimlachjes› (1867), a collection of poems, six editions of which were sold in two years. He published also ‹Familie en Kennissen› (1876), a collection of prose essays.

HAVERSIAN CANALS. See Bone.

HAVERSTRAW, N. Y., village in Rockland County, on the Haverstraw Bay, a part of the Hudson River, and on the West Shore and the New Jersey and New York, the New York, Ontario & Western railroads; about 30 miles north of New York and 35 miles south of West Point. The first settlement was made by the Dutch, who established here, about 1710, a trading post. It became a precinct in 1719, but the town was not incorporated until 1854. A short distance north of the village of Haverstraw, and near West Haverstraw, is the «Old Treason House,» the house owned in Revolutionary days by Thomas H. Smith, and the place where Arnold and André met in September 1780, and made all arrangements for the surrender of West Point. Except the addition of a wing, the house is to-day about as it was when Arnold visited it. From the room in which the final arrangements were made may be seen the Hudson and the opposite shore along which André journeyed toward Tarrytown. The «Haverstraw Community» was organized in Haverstraw in 1825, but remained in existence as a community only a few years. The chief industries of the village are silk weaving and brickmaking. Other manufactures are dynamite, baskets and brickmaking machinery. The village has an excellent high school and a public library, a hospital for crippled children and Stony Point Park. Consult 'Smith House at Haverstraw,' an article in *Magazine of American History* (Vol. V, New York 1881). Pop. 6,000.

HAVESTAD, Bernard, German Jesuit and missionary: b. Cologne, 1715; d. Munster, 1778. In 1748 he was sent as a missionary to Chile, where he rapidly learned the native dialect. He traveled through the lesser known parts of the country, visiting the Araucanians, the Cuenches, the Huillichos, the Guaicurus, etc., and collected a great mass of interesting information on the customs, the natural products, statistics, etc., of the region. On the expulsion of his order in 1768 he was arrested and conducted to Lima. He escaped death from shipwreck, and returned to Germany, where he published 'Chilidugu, sive Res Chilenses' (1777).

HAVET, ą'vā, **Ernest Auguste Eugène,** French scholar and philosopher: b. Paris, 11 April 1813; d. 1889. As a brilliant student, he received several educational appointments, and in 1840 was called to Paris as professor of Greek literature on the staff of the normal school. In 1855 he was appointed professor of Latin eloquence in the College of France. The chief of his many learned works is 'Christianisme et ses origines' (4 vols., 1871–84).

HAVET, Julien, French historian, son of Ernest Havet: b. Vitry-sur-Seine, 1853; d. 1893. He received his education at the Ecole des Chartes and the Ecole des Hautes Etudes. Afterward he was appointed assistant curator of the printed book department of the Bibliothèque Nationale. He made important historical researches, especially of the Merovingian and Carolingian periods. He published an edition of Gerbert's letters in 1889. Consult the volumes 'Questions mérovingiennes' (1896) and 'Opuscules inédits'; also the bibliography in 'Mélanges Havet' (Paris 1895).

HAVILAND, John, American architect and engineer: b. England, 15 Dec. 1792; d. Philadelphia, 12 March 1852. He studied architecture with Elmes in London. Subsequently went to Russia with a view of entering the imperial corps of engineers, and in 1816 emigrated to the United States. The Pittsburgh penitentiary, one of his earliest works, introduced the radiating form of constructing prisons, which was extensively adopted in the United States and in Europe. Among the principal edifices built after his plans are the halls of justice, better known as the «Tombs» (q.v.), in New York, rebuilt in 1902; the United States naval asylum in Norfolk, Va.; the State penitentiaries of New Jersey, Rhode Island and Missouri; the United States mint and the deaf and dumb asylum in Philadelphia; the Pennsylvania insane hospital at Harrisburg, besides numerous churches.

HAVILAND, William, British soldier: b. Ireland, 1718; d. 1784. He served in Scotland during the rebellion of 1745. During the years 1757–58 he fought under Abercrombie at Ticonderoga, and also under Amherst. In 1760 he fought his way at the head of 3,400 men through the French lines at Lake Champlain to join Murray and Amherst, who were converging on Montreal. After the capture of Montreal he served in the West Indies and was present at the reduction of Martinique and the conquest of Havana in 1762. He was made general in 1783.

HAVILDAR, a non-commissioned officer in the British Indian army, the highest rank of its class.

HAVIN, Léonor Joseph, French politician: b. Paris, 1799; d. 1868. He followed the profession of the law, and in 1830 was made justice of the peace at Saint-Lô. From 1830 to 1847 Mr. Havin represented department of La Manche in the Chamber of Deputies. There he was a prominent leader of the opposition and took a prominent part in the agitation which resulted in the February revolution. Nevertheless, Havin joined the Moderate party in the memorable National Assembly of 1848–49 and was prominent in all Republican movements until the *coup d'état* of Napoleon when he was ousted from the State Council. He continued, however, his preachments of liberal and Republican doctrines in the columns of the newspaper, *Le Siècle,* which he controlled.

HAVLIČEK, ha̧v'le-chek, **Karel,** Bohemian journalist and litterateur: b. Borová, whence he was frequently called «Havel Borovsky,» 1821; d. 1856. Karel was educated at the University of Prague, and for some time was employed as a teacher in Moscow. About 1848 he returned to Bohemia and became editor of the *Národní Noviny* for two years, after which he edited the *Slovan.* His liberal articles in the latter displeased the reactionary authorities of that day and Havlicek was incarcerated at Brixen in the Tirol in 1851. The 'Tyrolese Elegies' date from this period and are a sarcastic commentary on the political state of Austria at that time. In 1855 Havlicek returned to his native land but survived only a year, dying at Prague in 1856. Among his popular works are the ballad 'Král Lávra'; and the satire 'Křest sv. Vladímira' (1877). He also made numerous translations from Gogol, Voltaire and other authors. There are German translations of almost all his works. Consult the biography by Tuma (Prague 1883).

HAVRE, Mont., city and county-seat of Hill County, on the Great Northern Railroad, 80 miles northeast of Fort Benton. The Great Northern Railroad maintains extensive repair shops here. The city has also large investments in stock-raising, farming and coal-mining, all of which industries are vigorously carried on in the vicinity. The city owns the water-supply system. Pop. 3,624.

HAVRE, ä-vr, **Le,** France (formerly Le Havre-de-Grace, lä-vr-dė-gräs), an important commercial town and the second seaport of the country, in the department of Seine-Inférieure, on the north side of the estuary of the Seine, 143 miles by rail northwest of Paris. The town, comparatively modern, is built of brick or stone, with regular, straight, wide and well-cleaned streets. The public buildings include the church of Notre Dame, in bastard architecture, partly Gothic; the town-house, formerly the governor's palace; the Palais de Justice; the round tower of Francis I; the theatre, arsenal, exchange, library and barracks. Havre has a large commerce, for which its possesses great advantages. Its harbor is entered by a narrow channel formed by two long jetties stretching from east to west and kept clear by constant dredging. This channel leads to the outer harbor, an irregular expanse of no great extent, which is left dry at ebb-tide. Within the *avant port* are capacious wet-docks, lined with fine quays, eight miles in extent, and great warehouses. Havre commands the greater part of the import and export trade of Paris and of the more important towns in the north of France; importing vast quantities of colonial and other produce, among which cotton holds a most important place; and exporting articles of French manufacture. The total maritime movement of the port of Havre in 1916 was 17,700 vessels of 8,579,359 tons, compared with 12,810 vessels of 6,337,275 tons in 1915. The manufactures consist of paper, starch, lace, oil, refined sugar, cables and other marine cordage, chemicals, glass, sulphuric acid, earthen and stoneware. There are also breweries, gun factories and electrical works. From the building-yards a great number of sailing vessels and steamers are annually fitted out. In the 15th century Havre became of importance to form a new harbor in consequence of the silting up of that of Harfleur. The project was conceived and some progress made in it by Louis XII; but Havre continued little more than a fishing village till the time of Francis I, who erected numerous works and at immense expense gained the greater part of the present site of the town from the sea. A citadel was afterward built and Havre, as a place of strength, became the object of repeated contests between French and English. In October 1914, after the overrunning of Belgium by German armies, became the location of the Belgian government. Pop. 136,159.

HAVRE DE GRACE, hȧv'ėr dė gräs, Md., city in Harford County, on the Susquehanna River, near its entrance into Chesapeake Bay, and on the Philadelphia, Baltimore and Washington and the Baltimore and Ohio railroads, about 36 miles east-northeast of Baltimore. It is the south terminus of the Tide-water Canal. A small settlement was made here in about 1670. The chief manufactures are flour, sash, doors and blinds, lumber, boats and launches and canned fruits. The fisheries, especially shad and herring, are important. The trade is principally in the manufactured articles, coal and fish. A government fish hatchery is located on Battery Island. It contains a hospital and a public library. A popular race course is situated here. Pop. 4,212.

HAW, Battle of the, in the Revolution, 21 Feb. 1781. Henry Lee had been commissioned by Greene to prevent Tory reinforcements coming to Cornwallis, who had taken position at Hillsboro, and in the course of the movement attempted to surprise Tarleton. Tarleton had moved; but hearing that about 400 Tories under Colonel Pyle were on their way to join him, Lee determined to pass off his own «legion» as Tarleton's and capture them all. Forcing two captured British officers to keep up the deception, he moved forward, with Pickens' and Oldham's companies following, and met two young men who had been sent by Pyle to find Tarleton's camp; he was presented to them as Tarleton, and directed them to have Pyle's men drawn up beside the road while his «weary veterans» passed — his object being to capture and disarm them all. The plan succeeded perfectly till, just as he had taken Pyle's hand, part of the Tories discovered Pickens' militia and saw the trap, and at once fired on the American rear; the latter poured in a volley that killed 90 of the enemy at the first fire, and in the mêlée, despite appeals for quarter, a great number of the rest were killed and the majority wounded. Pyle escaped badly hurt, and the rest of the body dispersed unpursued.